S. Hrg. 98-49
Part 4

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1984

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

NINETY-EIGHTH CONGRESS

FIRST SESSION

ON

S. 675

AUTHORIZING APPROPRIATIONS FOR FISCAL YEAR 1984 FOR PROCUREMENT, FOR RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, AND FOR OPERATION AND MAINTENANCE, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEAR FOR THE ARMED FORCES AND FOR CIVILIAN PERSONNEL OF THE DEPARTMENT OF DEFENSE, AND FOR OTHER PURPOSES

PART 4—TACTICAL WARFARE

MARCH 8, 10, 14, 21, 22, 1983

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ARMY TACTICAL PROGRAMS

MARCH 10, 1983

Sculley, Dr. Jay R., Assistant Secretary of the Army (Research, Development and Acquisition), accompanied by Lt. Gen. James H. Merryman, USA, Deputy Chief of Staff for Research, Development and Acquisition; Brig. Gen. Phillip H. Mason, U.S. Army; Maj. Gen. Louis C. Wagner, Jr., Director of Requirements, Office of the Deputy Chief of Staff, Operations and Plans; and Brig. Gen. Donald S. Pihl, U.S. Army 1862

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MARCH 14, 1983

Schoultz, Vice Adm. Robert F., U.S. Navy, Deputy Chief of Naval Operations (Air Warfare), accompanied by Vice Adm. Ernest R. Seymour, U.S. Navy, Commander, Naval Air Systems Command; Lt. Gen. William H. Fitch, U.S. Marine Corps, Deputy Chief of Staff for Aviation, Headquarters, U.S. Marine Corps; Commodore John C. Weaver, U.S. Navy, F/A-18 Project Manager; Maj. R. Magnus, U.S. Marine Corps, Weapons Systems Program Coordinator, Aviation Weapons Systems Requirements Branch, Headquarters, U.S. Marine Corps; Col. J. A. Creech, U.S. Marine Corps, JVX Project Manager; and Maj. Gen. Harold G. Glasgow, U.S. Marine Corps, Deputy Chief of Staff for Aviation 2008

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MARCH 21, 1983

Skantze, Lt. Gen. Lawrence A., U.S. Air Force, Deputy Chief of Staff for Research, Development and Acquisition; accompanied by Maj. Gen. William A. Gorton, U.S. Air Force, Director of Operational Requirements; Maj. Gen. James H. Marshall, U.S. Air Force, Director of Development and Production; and Brig. Gen. James A. Baker, U.S. Air Force, Deputy Director of Operations 2122

AIR FORCE TACTICAL PROGRAMS

MARCH 22, 1983

Skantze, Lt. Gen. Lawrence A., USAF, Deputy Chief of Staff for Research, Development and Acquisition; accompanied by Maj. Gen. William A. Gorton, USAF, Director of Operational Requirements; Maj. Gen. James H. Marshall, USAF, Director of Development and Production; and Brig. Gen. Thomas A. Baker, USAF, Deputy Director of Operations 2301
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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1984

TUESDAY, MARCH 8, 1983

U.S. Senate,
Subcommittee on Tactical Warfare,
Committee on Armed Services,
Washington, D.C.

ARMY TACTICAL PROGRAMS

The subcommittee met in executive session, pursuant to notice, at 9:27 a.m., in room SR–232A, Russell Senate Office Building, Senator Barry Goldwater (chairman) presiding.

Present: Senators Goldwater, Warner, Wilson, Stennis, Levin, Kennedy, and Bingaman.

Staff present: Carl M. Smith, professional staff member; James G. Roche, minority staff director, and Willis D. Smith, deputy staff director and chief scientist for the minority; Robert S. Dotson, Frank J. Gaffney, and James C. Smith, professional staff members; Marie Fabrizio Dickinson and Tamara L. Farnsworth, staff assistants.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; John Campbell, assistant to Senator Warner; Peter Lennon, assistant to Senator Levin; Matthew Murray, assistant to Senator Kennedy, and Ed McGaffigan, assistant to Senator Bingaman.

OPENING STATEMENT BY SENATOR BARRY GOLDWATER, CHAIRMAN

Senator **Goldwater**. The hour of 9:29 having arrived, we will open the meeting.

Today we begin the first of the service hearings on tactical warfare systems. Yesterday we heard the threat briefing and I must express my concern over the threat to our tactical forces. The Soviet advances in warfighting capability are alarming; their relentless progress is sobering to say the least.

I might add that I wrote the Secretary of Defense yesterday and urged him to discontinue saying that they have quantity but we have the quality. I think they have the quality now. Maybe not in every case as good as ours, but certainly when we see the heads-up system that they have in their aircraft and the laser-guided weapons they are using in their tanks. I think we have to stop contending that we have a qualitative advantage and look objectively at the system that we may face on the battlefield.

We begin our service hearings with the Army and our principal Army witnesses are Dr. Jay R. Sculley, Assistant Secretary of the Army—Research, Development and Acquisition—and Lt. Gen. James H. Merryman, the Deputy Chief of Staff for Research, Development and Acquisition. Dr. Sculley and General Merryman, we welcome you back before the subcommittee.

The Army has embarked on an unprecedented modernization effort. Nearly every major Army system is being replaced—the Abrams tank, the Bradley fighting vehicle, the Patriot Air Defense System, the Apache attack helicopter—to name just a few. In nearly all of these systems, the Army is in the early stages of the procurement cycle and the so-called Bow Wave of modernization is no longer in the future—it is now.

The subcommittee will have to look hard at these programs. Budgetary pressures are great and systems that are "on the margin" may have to be viewed in terms of affordability. Systems that provide great leverage on the battlefield should be given priority. We look to you, Dr. Sculley and General Merryman, to give us some sense of these priorities.

I might say there are so many people in the service who think I only am interested in the air and the "blue suiter." I was sworn in as a second lieutenant of the infantry in 1930 at Fort Huachuca with the 125th Infantry. I am very proud of that service having been a part of my life.

You may proceed, Dr. Sculley.

STATEMENT OF DR. JAY R. SCULLEY, ASSISTANT SECRETARY OF THE ARMY (RESEARCH, DEVELOPMENT AND ACQUISITION)

Dr. **Sculley**. Thank you, Mr. Chairman.

It is a pleasure for me to appear before this committee again. I am also pleased to have Gen. Jim Merryman and Maj. Gen. Louis Wagner, Director of Requirements from our office of the Deputy Chief of Staff for Plans and Operations with me today.

Senator **Goldwater**. By the way, your whole statement will be put in the record as read. If you want to brief it, that will be better.

Dr. **Sculley**. I would, sir, mention the committee was earlier provided with our statement and with your permission we would like to have it entered into the record.

Senator **Goldwater**. Without objection, it will be entered in the record.

Dr. **Sculley**. Again I appreciate this opportunity to explain the rationale and framework for the 1984 research, development, and procurement request of $24 billion.

MODERNIZATION UPDATE AND COST CONTROL ACTIONS

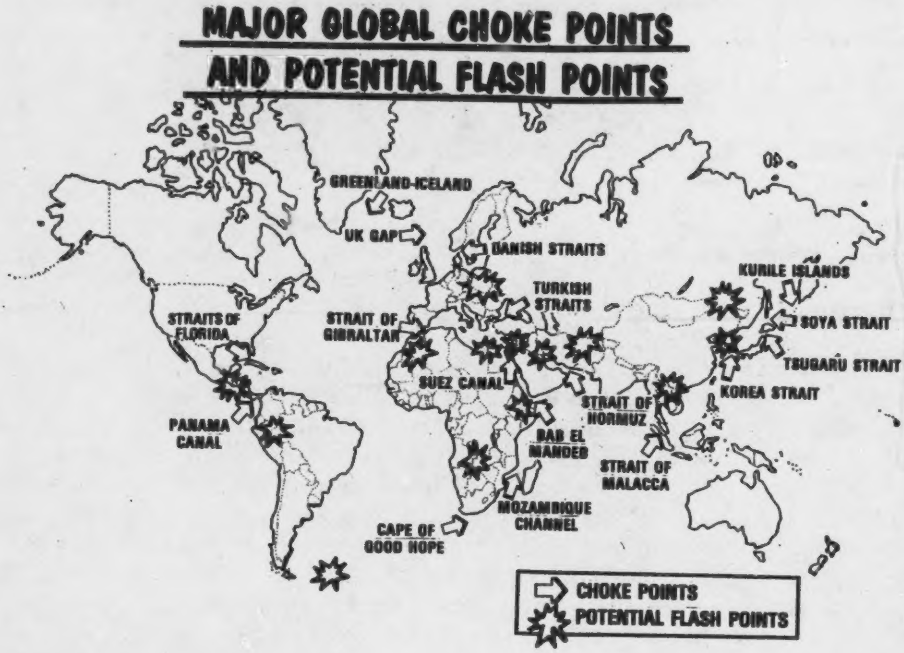
In addition, I would like to update you on the Army's modernization program and our cost and management control actions.

World events during the past year clearly illustrate the scope and necessity of the Army's modernization efforts. The streets of Beirut and the muddy roads of the Falklands are deadly examples of the increasingly unpredictable and diverse potential for international conflict.

We begin 1983 with the Armies of Iran and Iraq locked in a protracted stalemate which threatens the stability of that vital region. At the same time direct Soviet intervention in Afghanistan and their surrogate activities around the world are constant reminders of the massive and unrelenting build-up of the Soviet armed forces.

The imposition of martial law and continuing political uncertainties in Poland have brought this threat home to our European allies.

In addition to the potential for conflict in so many different parts of the world, it is essential that we insure access to key strategic minerals and metal sources, maintain the free flow of oil and guarantee the political autonomy of our allies.


MAJOR GLOBAL CHOKE POINTS
AND POTENTIAL FLASH POINTS
GREENLAND-ICELAND
UK GAP
DANISH STRAITS
KURILE ISLANDS
TURKISH STRAITS
SOYA STRAIT
STRAITS OF FLORIDA
STRAIT OF GIBRALTAR
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SUEZ CANAL
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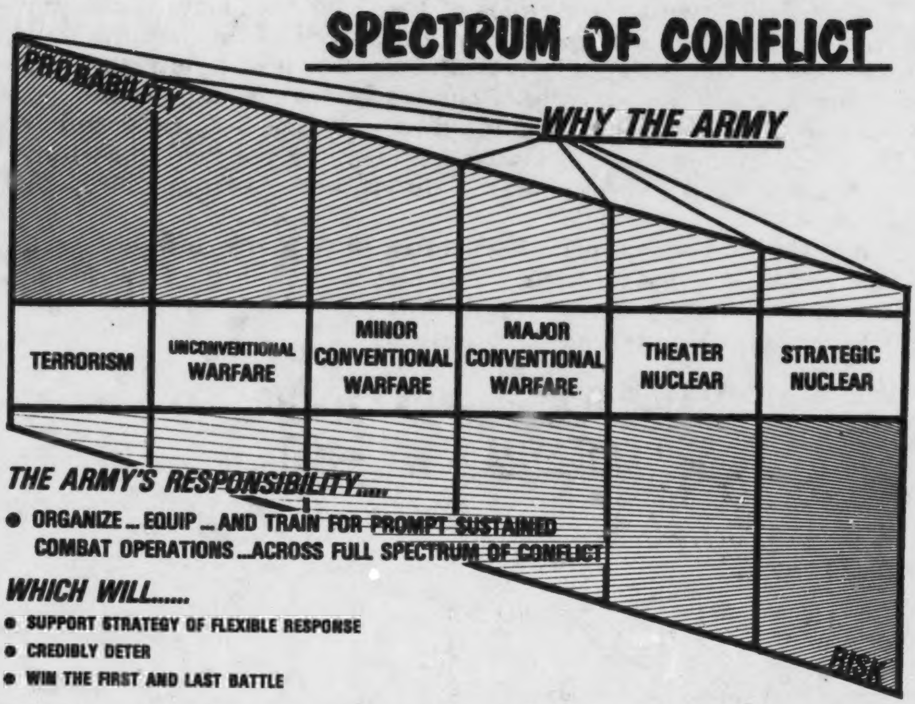
STRAIT OF HORMUZ
PANAMA CANAL
BAB EL MANDEB
STRAIT OF MALACCA
MOZAMBIQUE CHANNEL
CAPE OF GOOD HOPE
CHOKE POINTS
POTENTIAL FLASH POINTS

A look at all the major choke points and potential flash points around the world shows the uncertainty and variety of scenarios in which the Army must be prepared to defend our national interest. It is the spectrum of conflict——

Senator GOLDWATER. I am glad you put the emphasis that you did on the straits of the world.

Dr. SCULLEY. Yes, sir. Our Secretary, Jack Marsh, speaks extensively on these choke points and flash points.

Senator GOLDWATER. That is an old Navy theory that nobody believed for a long time.



THE ARMY'S RESPONSIBILITY....

- ORGANIZE...EQUIP...AND TRAIN FOR PROMPT SUSTAINED COMBAT OPERATIONS...ACROSS FULL SPECTRUM OF CONFLICT

WHICH WILL......

- SUPPORT STRATEGY OF FLEXIBLE RESPONSE
- CREDIBLY DETER
- WIN THE FIRST AND LAST BATTLE

Dr. SCULLEY. It is this spectrum of conflict that defines the Army's mission and therefore our weapon system design and the mix of hardware necessary to fulfill our obligations. The varied terrains, environments, logistics and threats determine the operating needs of the Army. These factors in turn impact the structure of our forces from the heavy to the light divisions and the new high technology division now under development. For example, our lightest division force, the airborne division, is keyed to strategic projection with forcible entry and capabilities. At the other extreme the mechanized or our armored divisions are designed to defeat armor intensive enemy forces in battles fought over a wide range of areas. These divisions require considerable support to sustain operations and are strategically the most difficult to deploy.

The different environmental conditions we would expect to encounter in Europe versus parts of the Middle East also impact hardware design. In Europe, for instance, we must operate in relatively cold temperatures, with fog, snow or darkness 70 percent of the time, on highways, muddy or snowy fields, and urban streets where we can expect heavy concentrations of enemy forces.

Senator GOLDWATER. Are you sure of that percentage of overcast on the European continent? Is that 70 percent?

Dr. SCULLEY. I think it is really a combination of less than ideal circumstances, sir, which includes darkness, fog, snow, less than ideal conditions.

Senator GOLDWATER. You put it at 70 percent?

Mr. SCULLEY. Yes, sir.

On the other hand, in many parts of the Middle East or Southwest Asia we must be prepared to encounter high temperatures, blowing sand and a widely dispersed enemy.

In other parts of the world we will face jungle or tropical environments. All of these factors impact our weapon systems' design and mix of hardware required to successfully execute our mission.

In consideration of all of these factors, I have outlined our management strategy is to coordinate the Army's research, development and acquisition efforts to deploy an integrated family of highly mobile technologically leveraged weapons which insure maximum survivability of our soldiers across the spectrum of conflicts they may face. To do this we are emphasizing mobility, flexible mission uses and reduced logistics support requirements.

The Army's modernization program was designed to meet these objectives and with your support this new generation of weapon systems is now in production. In calendar year 1983 we will deliver production versions of the systems you see here with the execption of the Apache attack helicopter which will be delivered in February 1984.

As a result, we will also be able to improve the quality of equipment in the Reserve forces. One billion dollars of this year's procurement account is projected to be distributed to the Reserve components in future years.

This year, as a result of earlier appropriations, some $750 million of the newly procured support and combat equipment will be delivered to Guard and Reserve units.

While the major new weapons platforms are the most publicized part of our modernization program, it is important to recognize that they represent only approximately 43 percent of our total procurement budget or 12 percent of the Army's total budget.

For example, our 1984 procurement budget is made up of the following mix: New weapons platforms such as MLRS, the Patriot, division air defense gun, 43 percent. Modifications to existing platforms and product improvements for existing systems, such as the CH-47D Chinook helicopter, 6 percent.

Initial spares, support equipment, and facilities such as that for avionics, missiles, and production base support, 12 percent.

Support vehicles, machinery and equipment such as the high mobility multipurpose wheel vehicle [HMMWV], 5-ton truck, cranes, generators, and forklift, 13 percent.

Communications and electronic equipment such as the single channel ground and airborne radio subsystem—[SINCGARS] and joint crisis management capability, 14 percent and ammunition, 12 percent.

Senator KENNEDY. Mr. Chairman, could I ask how that mix has changed in the last couple of years?

Dr. SCULLEY. We at this time, sir, feel that we are spending more on the procurement of new systems and equipping and modernizing the Army. Yet I attempt to show that we are doing so with a balanced approach with the cost up front.

Senator KENNEDY. Maybe you can supply for the record, how those percentages have varied during the last several years.

Dr. SCULLEY. We will be happy to do that, Senator.

[The information follows:]

Following are the percentages for fiscal year 1982 and fiscal year 1983. The source of the data is the fiscal year 1984 President's Budget:

[In percent]

	Fiscal year—	
	1982	1983
New weapons platforms	41	45
Modifications	7	5
Initial spares, support equipment and facilities	9	11
Support vehicles, machinery and equipment	14	12
Communications and electronic equipment	12	13
Ammunition	17	14

Dr. SCULLEY. These other investments are necessary to maintain infrastructure and supportability of the new weapon systems we are deploying. For example, we must invest approximately $270 million per year just to maintain the 15-year average age of the 2½-ton truck in our inventory.

Another example is our ammunition production lines which require an investment of $2 billion per year to keep them at minimum sustaining rates.

At the same time in a technologically volatile environment we cannot ignore future needs. To achieve a balance between our modernization efforts and the next generation threat we are focusing our research and development efforts on key leverage technologies. This strategy will minimize the cost of developing future systems while taking full advantage of U.S. scientific strength.

We have identified five functional thrusts which will form the nucleus of future systems. These include VISTA—very intelligent surveillance and target acquisition—distributed command and control communications and intelligence, self-contained munitions, soldier-machine interface and biotechnology.

In our fiscal year 1984 budget request we have allocated $328 million to these new thrusts which represent 28 percent of our technology base funds. We plan to control the implementation of new technology with configuration and management decisions at the headquarters level and will use pre-planned product improvements wherever possible. This will allow us to extend the useful life of existing systems, reduce the laboratory to deployment time and minimize the probability of technological surprise.

Perhaps the best example of our efforts at blending the research, development and procurement process is the high technology test bed program. The objective here is to reduce the amount of strategic lift required for a division while retaining combat power approaching that of a heavy division.

There have been many allegations that our efforts aimed at accelerating the implementation of high technology in weapon systems and cost management control are mutually exclusive objectives. In reality I feel that they are complementary and in many cases depend upon one another.

In my opinion, superiority in weapons, machinery or any other area is not a 100-yard dash or even a 5-mile run, but rather an endless marathon in which we must be continuously innovative, progressive, and persistent to stay ahead.

The cornerstone of this philosophy is discipline, personnel, organization, and management. In this regard I will address some of the things we have been doing to accomplish our goal of producing the required equipment in an efficient and economical manner. It is not business as usual in the Army.

I personally have made cost and management control my No. 1 priority and have focused my staff's efforts on implementing the initiative we outlined to you last year. We have made significant progress.

MANAGEMENT GOAL: READINESS THROUGH MODERNIZATION

Actions: Greater program visibility; more personal involvement; greater program stability; and program priorities.

COST DISCIPLINE EFFORTS

Over the last 3 years there have been several major efforts aimed at improving the acquisition process. The Vice Chief of Staff's cost discipline efforts resulted in specific actions being implemented. The report of the Secretary of the Army's Cost Discipline Advisory Committee resulted in an additional 40 actions.

The acquisition steering group has identified 15 initiatives that are now being implemented. In addition, the Defense acquisition improvement program, which was the Carlucci initiative, had outlined 32 objectives.

In his statement General Merryman will discuss some of the specific actions we have implemented as a result of these efforts. From a management standpoint one of the most important results is the continuous real time update to Army leadership on the cost, technical and scheduled performance of all major weapon systems. This involves a joint ongoing effort among the Secretariat, the Army staff and DARCOM, to work with the program managers in identifying and solving potential problems early.

This system has allowed us to shift from a reactive to an active mode and has all but eliminated unpleasant surprises.

Closely alined with the ongoing management review is DARCOM's new program management control system. This system specifically outlines the program's acquisition plan requirement, cost and operating objectives into an integrated management plan that must be approved by DARCOM headquarters and the Department of the Army.

Once the plan is finalized, all future changes must be approved at the headquarters level. We have expanded our analysis of selected acquisition reports—SAR. The Under Secretary and the Vice Chief of Staff and other senior Army managers now conduct quarterly reviews of the Army SAR analysis. We have established Risk Review Teams to independently examine all aspects of the program prior to an Army Systems Acquisition Review Council decision.

We linked the planning programing and budgeting systems to the system decision milestones so that trade-offs must be made at the time of the decision if recommended costs exceed programed costs. We now update our baseline cost estimates annually and conduct independent cost estimates on major systems.

Previously estimates were conducted at milestone reviews which could be as much as 3 to 5 years apart. We are taking advantage of the cost savings potential of multiyear procurement where it is appropriate. The Black Hawk and the ALQ-136 contracts were awarded in 1982. We are now evaluating the multiple launch rocket system, CH-47D, and will award a T-700 series engine multi-year contract in an effort to reduce costs.

In the past 2 years we have implemented an effective management control system, completed the transition to production on most of our major systems and have clearly defined our future hardware strategy and technology thrust through our long-range planning process.

We are now initiating aggressive management actions to reduce unit costs. The Army's objective is to reduce the net cost of major systems through specific program management initiatives. We are insisting that acquisition strategies link the contractor's future profit to his past cost performance. Competition must be used throughout the subcontractor-vendor supply chain on the basis of total cost to the Army over the expected life of the program.

We are implementing innovative ideas to reduce the indirect costs of manufacturing, engineering and administration. Strong emphasis is being placed on capital investments and the elimination of nonessential performance requirements, specifications or other functional cost elements.

At the program manager level, these cost reduction elements must be included in annual operating plans and coordinated with contracting actions to reduce the Army's total program cost.

Although many problems remain to be solved, our continued efforts will enable us to identify and correct them. With your past support we have made significant progress toward a modern, well-equipped Army and have substantially improved the acquisition management process.

We certainly appreciate this opportunity to describe our program and look forward to your continued support.

I will be followed by General Merryman who will add a few introductory remarks and then General Wagner will give a tactical overview and we will conclude with a more detailed discussion of our systems in a mission area format.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Sculley follows:]

PREPARED STATEMENT BY DR. JAY R. SCULLEY, ASSISTANT SECRETARY OF THE ARMY (RESEARCH, DEVELOPMENT AND AQUISITION)

Thank you, Mr. Chairman. It is a pleasure for General Merryman and me to appear before the committee again. The committee was provided with a comprehensive statement earlier. With your permission, I would like to have it inserted in the Record.

I appreciate this opportunity to explain the rationale and framework for our 1984 research, development and procurement request of $24 billion. In addition, I would like to update you on the Army's modernization program, and our cost and management control actions.

World events during the past year clearly illustrate the scope and necessity of the Army's modernization efforts. The streets of Beirut and the muddy roads of the

Falklands are deadly examples of the increasingly unpredictable and diverse potential for international conflict.

We begin 1983 with the armies of Iran and Iraq locked in a protracted stalemate which threatens the stability of that vital region. At the same time, direct Soviet intervention in Afghanistan and their surrogate activities around the world are constant reminders of the massive and unrelenting buildup of the Soviet armed forces. The imposition of martial law and continuing political uncertainties in Poland have brought this threat home to our European Allies.

In addition to the potential for conflict in so many different parts of the world, It is essential that we insure access to key strategic minerals and metal sources, maintain the free flow of oil, and guarantee the political autonomy of our allies. A look at all the major choke points and potential flashpoints around the world, shows the uncertainty and variety of scenarios in which the Army must be prepared to defend our national interests.

It is this spectrum of conflicts that defines the Army's mission, and therefore our weapon system design and the mix of hardware necessary to fullfill our obligations. The varied terrains, environments, logistics, and threats determine the operating needs of the Army. These factors, in turn, impact the structure of our forces from the heavy to light divisions and the new high technology division now under development.

For example, our lightest division force, the airborne division, is keyed to strategic projection with forcible entry capabilities. At the other extreme, the mechanized or armored divisions are designed to defeat intensive armored enemy forces in battles fought over a wide range of areas. These divisions require considerable support to sustain operations and are strategically the most difficult to deploy.

The different environmental conditions we would expect to encounter in Europe versus parts of the Middle East also impacts hardware design. In Europe, we must operate in relatively cold temperatures—with fog, snow, or darkness 70 percent of the time—on highways, muddy or snowy fields, and urban streets where we can expect heavy concentrations of enemy forces.

In many parts of the Middle East, we must be prepared to encounter high temperatures, blowing sand, and a widely dispersed enemy. In other parts of the world, we would face jungle or tropical environments. All of these factors impact our weapon system design and the mix of hardware required to successfully execute our mission.

In consideration of all of these factors I have outlined, our management strategy is to coordinate the Army's research, development, and acquisition efforts to deploy an integrated family of highly mobile, technologically leveraged weapons which insure maximum survivability of our soldiers across the spectrum of conflicts they may face. To do this, we are emphasizing mobility, flexible mission uses, and reduced logistics support. The Army's modernization program was designed to meet these objectives and with your support, this new generation of weapon systems is now in production. In calendar year 1983, we will deliver production versions of the M1, multiple launch rocket system, Apache, Bradley, Patriot, Divad, Hellfire, Ch47D, Black Hawk, Stinger, Tow 2, and Pershing II.

As a result, we will also be able to improve the quality of equipment in the Reserve forces. Almost $1 billion of this years procurement account is projected to be distributed to the reserve components in future years This year, as a result of earlier appropriations, some $750 million of newly procured support and combat equipment will be delivered to Guard and Reserve units.

While the major new weapon platforms are the most publicized part of our modernization program, it is important to recognize that they represent only about 43 percent of our total procurement budget or approximately 12 percent of the Army's total budget. For example, our 1984 procurement budget is made up of the following equipment mix:

	Percent
New weapon platforms, such as Black Hawk, M1, Patriot and Divad	43
Modifications to existing platforms and product improvements such as the CH47D program	6
Initial spares, support equipment and facilities, such as that for avionics, missiles, and production base support	13
Support vehicles, machinery, and equipment such as the high mobility multi-purpose wheeled vehicle (HMMWV), 5-ton trucks, cranes, generators, and fork lifts	12
Communications and electronic equipment, such as SINCGARS and joint crisis management capability (JCMC)	14
Ammunition	12

These other investments are necessary to maintain the infrastructure and supportability of the new weapon systems we are deploying. For example, we must invest approximately $269 million per year just to maintain the 15-year average age of the 2½-ton trucks in our inventory. Another example is our ammunition production lines which require an investment of $2 billion per year to keep them at minimum sustaining rates.

At the same time, in a technologically volatile environment, we cannot ignore our future needs. To achieve a balance between our modernizaton efforts and the next generation threat, we are focusing our research and development efforts on key leverage techologies. This strategy will minimize the cost of developing future systems and take full advantage of U.S. scientific strengths. We have developed five functional thrusts which will form the nucleus of future systems. These include VISTA—Very Intelligent Surveillance and Target Acquisition—devices; distributed command, control, communications and intelligence; self-contained munitions, soldier-machine interface; and bio-technology. In our fiscal year 1984 budget request, we have allocated $328 million to these new thrusts, which represents 28 percent of our technology base funds.

We plan to control the implementation of new technologies with configuration management decisions at the headquarters level and will use preplanned product improvements wherever possible. This will allow us to extend the useful life of existing systems, reduce the laboratory-to-deployment time and minimize the probability of technological surprise.

Perhaps the best example of our efforts at blending the research and development and procurement process is the high technology test bed program. The objective is to reduce the amount of strategic lift required for a division with combat power approaching a heavy armored division.

There have been many allegations that accelerating the implementation of high technology in weapons systems and cost management control are mutually exclusive objectives. In reality, they are complementary and, in most cases, dependent on each other.

In my opinion, superiority in weapons, machinery, or any other area is not a 100-yard dash or even a 5-mile run. Leadership is an endless marathon in which we must be continuously innovative, progressive, and persistent to stay ahead. The cornerstone of this philosophy is discipline—personal, organizational, and management.

It is not business as usual in the Army. I personally have made cost and management control my No. 1 priority and have focused my staff's efforts on implementing the inititatives we outlined to you last year. The Army has more significant progress.

Over the last 3 years, there have been several major efforts aimed at improving the acquisition process. The Vice Chief of Staff's cost discipline efforts resulted in specific actions being implemented. The Secretary of the Army's cost discipline advisory committee resulted in an additional 40 actions. The Acquisition Steering Group has identified 15 initiatives that are now being implemented. In addition, the defense acquisition improvement program or Carlucci initiatives had outlined 32 objectives. In his statement, General Merryman will discuss the specific actions we have implemented as a result of these efforts.

From a management standpoint, one of the most important results is a continuous real time update to the Army leadership on the cost, technical, and schedule performance of all major programs. This involves a joint ongoing effort between the Secretariat, the Army Staff and DARCOM to work with the program managers in identifying and solving potential problems early. This system has allowed us to shift from a reactive to an active mode and has all but eliminated unpleasant surprises.

Closely aligned with the ongoing management review is DARCOM's new program management control system. This system specifically outlines the program's acquisition plan, requirements, costs, and operating objectives into an integrated management plan that must be approved by DARCOM headquarters and the Department of the Army. Once the plan is finalized, all future changes must be approved at the headquarters level.

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We have linked the planning, programing, and budgeting system to the systems decision milestones so that tradeoffs must be made at the time of the decision if recommended costs exceed programed costs.

We now update our baseline cost estimates annually and conduct independent cost estimates on major systems. Previously, estimates were conducted at milestone reviews which could be 3-5 years apart.

We are taking advantage of the cost savings potential of multiyear procurement where it is appropriate. The Black Hawk and ALQ-136 contracts were awarded in 1982. We are now evaluating the multiple launch rocket system, CH47, T700 engines and several other programs in an effort to reduce costs.

In the past 2 years, we have implemented an effective management control system, completed the transition to production on most major systems, and have clearly defined our future hardware strategy and technology thrusts.

We are now initiating aggressive management actions to reduce unit costs. The Army's objective is to reduce the net cost of major weapon systems through specific program management initiatives.

We are insisting that acquisition strategies link the contractor's future profits to his past cost performance. Competition must be used throughout the subcontractor-vendor supply chain on the basis of total costs to the Army over the expected life of the program. We are implementing innovative ideas to reduce the indirect costs of manufacturing, engineering, and administration. Strong emphasis is being placed on capital investments and elimination of non-essential performance requirements, specifications or other functional cost drivers. At the program manager level, these cost reduction elements must be included in annual operating plans and coordinated with contracting actions to reduce the Army's total program cost.

It is not business as usual in the Army. With your support, we have made significant progress toward a modern-well equipped Army and have substantially improved the acquisition and management process. We certainly appreciate your cooperation and look forward to your continued support.

Senator **Goldwater**. Thank you very much.

General Merryman?

General **Merryman**. Senator Goldwater, it is good to be back before this committee once again.

With your permission, I will enter my statement for the record.

[The prepared statement of Lieutenant General Merryman follows:]

Prepared Statement by Lt. Gen. James. H. Merryman, USA, Deputy Chief of Staff for Research, Development and Acquisition

It is a privilege to appear before this committee once again to explain how our Army proposes to arm and equip itself. We look forward to working with you again to meet our common goal—that of providing a first-rate Army, an Army that can fight anywhere and win.

While our focus is necessarily on our defense needs, we understand and appreciate that Congress must fund for many other programs which are also vital to the well-being of our country and its citizens. The Army is determined to assist you in this responsibility by doing the best we can to manage the resources you make available to us effectively, while equipping and modernizing a first-rate Army of which all Americans can be proud.

In last year's opening statement, we referred to the budget increases represented by the fiscal year 1981 supplemental and fiscal year 1982 amendment. We described those increments as important first steps toward resolving significant deficiencies in both the quantity and quality of our arms and equipment. The fiscal year 1983 budget reinforced that trend with funding increases that enabled us to improve the production efficiency of our most critical items. This favorable trend must be continued if we are to keep our forward momentum and insure that the gap that exists between Soviet forces and ourselves does not widen. Today we are presenting you with a combined procurement and RDTE request of approximately $23.9 billion for fiscal year 1984. We will use these dollars to continue to improve the Army's near-term readiness posture, to modernize the total force, and to support research and development.

Near-term readiness is a must. General Meyer has described the Army's basic requirement for the 1980's as preparing for the "three days of war": To deter the day before war, to fight the day of war, and to terminate conflict in such a way that on the day after war, the United States and its allies enjoy an acceptable level of security. Without near-term readiness, this challenge would go unmet. We do not know when or where our Nation might be confronted or challenged by an enemy. We do know that our Army must be prepared to defend the Nation and our national interests whenever and wherever they are threatened.

Readiness depends in large measure on seeing that our soldiers have the arms and equipment they need. We have made progress in meeting our requirements; however, today, our Army is still short a large amount of the materiel which is needed to bring units up to full strength and to fill war reserve stocks. There remain units today—active, National Guard, and Army Reserve—which simply do not have all the arms and equipment that they should. Reduction of these materiel shortages in the force must take the highest priority. To accomplish this, we must continue to procure additional quantities of equipment—currently fielded, product-improved, and new—for both the Active and Reserve components as quickly as possible.

The requirement to equip our Army takes on increased importance when one considers the quantitative advantage enjoyed by the Soviets in both arms and equipment. They have produced and continue to produce large quantities of equipment at enormous cost to their economy. Today, the Soviets outinvest and outproduce us by about a 2-to-1 margin in most categories of military equipment. Despite the progress we have made in equipping the force, the quantitative imbalance will remain.

While the Soviet numerical advantage increases the importance of equipping our Army, it also illustrates the need to modernize. Our Army can expect to find itself outnumbered by a Soviet adversary. Our success in overcoming the strength of numbers will depend in large measure on the quality of our equipment. However, the additional threat posed by the ever-increasing quality of Soviet weapons dictates a need to accelerate our modernization effort lest we continue to be faced with simultaneous deficiencies in both the quantitative and qualitative aspects of our materiel.

It is important to note that modernization not only provides us with more capable equipment but also contributes significantly to improved readiness. Shortages are being filled with new and improved materiel. Overage, obsolescent equipment that is difficult and expensive to maintain in a combat ready posture is being replaced with new equipment that is designed with maintenance and reliability in mind. For example, the Black Hawk helicopter, a fielded system, is more powerful and faster than the UH-1 "Huey" it replaces and is also easier to maintain. The Black Hawk requires only 1.6 maintenance man-hours per flying hour at the unit level as compared to 3.4 man-hours for the Huey. Current results from the initial production testing indicate that the Bradley fighting vehicles will exceed the reliablity goal. Testing has thus far demonstrated a reliability of 381 mean miles between failure (MMBF) as compared to a goal of 240 MMBF. The Patriot missile requires no field maintenance and will perform the air defense mission with less equipment and fewer repair parts. Repairs will be facilitated by a diagnostic system which will isolate the malfunction and display the step-by-step procedures required to return the system to operation. These and our other modernization systems will contribute significantly to both our readiness and our battlefield capabilities.

It is important to note that our modernization effort also applies to the Reserve Component. National Guard and Army Reserve units are receiving and will continue to receive new and improved systems that cover the full spectrum of our mission needs—the M1 tank and Bradley fighting vehicles for ground forces, the Roland and Stinger air defense systems, new attack and utility helicopters, and many other items.

We are proud of the systems that have been developed during the 1970's; however, it would be incorrect if we led you to believe that the Army's materiel acquisition philosophy dictates a new development program for every change in the threat. On the contrary, we recognize that we live in a world of constrained resources and must take maximum advantage of the investment we have made in fielded systems. To do this, we have followed and will continue to follow the policy of "improve if we can, buy new systems only when we must."

The M60 series tank—a product of the late 1950's technology—is one example of evolutionary development through product improvement. Improvements that have been made to the basic M60 tank include engine changes that have upgraded reliability and maintainability, a stabilization system for shoot-on-the-move capability and passive infrared sights to improve night vision. The latest version, the M60A3, incorporates a laser rangefinder, thermal sights which penetrate darkness and obscurants, and a ballistic computer which automatically lays the gun for the correct range and lead angle. The result is a 20-year-old tank that continues to be a formidable weapon on today's battlefield.

The CH-47 Chinook medium-lift helicopter, which was fielded in 1962, is another example of our product inprovement program. The modernization program currently underway will extend the useful life of the CH-47 fleet beyond the year 2000. The

Chaparral and Hawk air defense systems, the TOW antiarmor missile, and the Cobra attack helicopter are but a few of many other systems that have had their operational capabilities upgraded and lifetimes extended by product improvement.

It is important to note that systems improvements have the potential to benefit not only our own Army but those of allied and friendly nations as well. The Army has embarked on an effort designed to improve the combat capabilities of older U.S.-origin equipment and munitions in the inventories of our Active and Reserve Components, our allies, and other friendly nations. This is to be done in conjunction with the Army's present modernization program.

The focus of this initiative is in antiarmor, air defense, and command, control, communications and intelligence (C^3I), and those systems which can be upgraded using either current modifications, or through emerging, innovative technologies which promise the most rewarding near-term results. The upgrade modifications which result will have application to our own equipment inventory and will also be available for foreign military sales purchases. Countries with industrial capabilities may also consider some form of co-production. The product-improved Vulcan air defense system (PIVADS) is an example of this approach. The PIVADS modifications will provide our light forces with a near-term improvement in their short-range air defense capability, add significantly to reserve component air defense capabilities as the Sergeant York replaces Vulcan in active divisions, and be available for purchases by allies and friends.

It must be recognized, however, that the improvement potential of any given system is limited, and that both technology and the threat continue to change. For example, some of our current air defense systems were simply not designed to function in the sophisticated electronic countermeasures environment which the Soviets are presently capable of establishing. They are also incapable of multiple target track/multiple engagement operations. The technology that makes that capability possible did not exist 20 years ago, and it is impractical to attempt to build it into an obsolete system. Therefore, we had to develop new, more capable weapons. In large measure, Patriot, the Sergeant York air defense gun, and Stinger, the products of the decade of successful research and development we referred to earlier, are ready to fill the gaps where older systems are inadequate, and where the potential for improvement has been exhausted.

In addition to improving and modernizing current types of equipment, the Army will also develop and use new concepts to add to its future battlefield capabilities. The Remotely Piloted Vehicle (RPV) and the Joint Surveillance and Target Attack Radar System (JSTARS) will "see" into enemy zones of control, and will provide information on targets, locations, and intentions. The Position Location Reporting System (PLRS) will enable commanders to locate and identify their forces rapidly and precisely, while the Navstar Global Positioning System (GPS) will provide users with instantaneous data on position, velocity and time through a satellite-based radio navigation system.

Although we strongly believe that we should use our Nation's technological strengths to counter the Soviet Union's quantitative advantage. You should be aware that our acquisition philosophy carefully weighs the impact of "complexity" versus the added benefits of "sophistication." Some contend that our new systems are too complex or sophisticated. Unfortunately, these terms are often mistakenly used synonomously. "Complex" by our dictionary translates to complicated and what is complicated in terms of operation or maintenance is to be avoided. Sophisticated equipment, on the other hand, takes advantage of the best features of advanced technology. Such sophisticated equipment can be made easy to operate and maintain. For example, the checkout counter at your local supermarket is sophisticated. It depends on the complexities of laser scanners, holography—three-dimensional imaging—and microcomputers. However, the operation is fast, simple, and accurate, and repairs are normally based on a simple modular replacement concept. We try to apply the same logic in developing our military systems that range from a relatively simple laser rangefinder to the automatic search and track radar of the Sergeant York air defense gun. Our objective is to use the best features of technology to obtain greater simplicity for the operator and maintainer. We fully understand that the country cannot afford an arms of Ph. D's to operate its sophisticated equipment; the average American soldier must be able to operate and maintain it.

We also use technology to bring about a synergistic effect on the battlefield. This is because we have found the capability of our weapons used in combination is greater than the sum of their individual capabilities. For example, our fire direction system, tacfire, gives us an automatic date processing system that enables our artillery to be highly responsive to fire missions. The Firefinder Counterbattery Radar System can locate enemy artillery positions by backplotting the trajectories of projectiles while they are still in flight. In combination, Tacfire and Firefighter can provide the enemy's location to our guns before the first incoming round hits. Thus, our artillery can bring fire to bear on the enemy before he can adjust fires or "shoot and scoot." Individually, both Tacfire and Firefighter perform important functions in fire control and target acquisition. When used together to engage highly mobile enemy artillery, the results are devastating. On the battlefield, systems such as these complement one another and make it possible for a small, quality army to defeat superior numbers.

It is true that sophistication increases the cost of our equipment. Therefore, we must insure that we do not ask for more than is required. On the other hand, we must use sophistication when it makes sense to achieve the necessary effectiveness and survivability in battle. For example, night vision and thermal imaging devices are expensive, and systems such as the M1 tank, the Bradley fighting vehicles, and the Apache attack helicopter would cost less without them. To eliminate them, however, would deprive our soldiers of the ability to fight at night as if it were day, a capability that gives them an edge on the battlefield.

Earlier, I expressed our appreciation for the support which the Congress has provided and stated our intention to manage the resources you provide more efficently. Efficient management is especially important today. When the Nation is reducing the amount of money which is going into other Federal programs, it is only right that the defense program receive continued scrutiny. It is clearly our responsibility to insure that we are spending the taxpayers' dollars as carefully as we can, and to see that the army gets the best return on each dollar it invests in weapons and equipment.

In this regard, the Army has been seeking to improve the materiel acquisition process in order to control costs and to shorten the time between the development of a requirement and the actual fielding of the hardware to satisfy that need. Last year, the Army leadership, from the Secretary on down, took a long, hard look at the area of cost discipline. The results of this major undertaking indicated that to control costs and shorten the acquisition process, we must have:

More stability in our programs;
Better management information;
Better and more frequent estimates;
A better transition from development to production; and
Preplanned product improvement (P^3I).

Program stability is a key element in controlling cost growth. The steps we are taking are intended to dampen the variations that programs have experienced in requirements and funding, and to create a more stable, predictable environment for both Army management and industry. Among the most promising initiatives are the following:

The stable program list. Last year, the Army identified four key systems—the Abrams tank, the Bradley fighting vehicles, and the Black Hawk and CH-47D Chinook helicopters—for stable program funding. Our objective was to establish and maintain a minimum production floor for these systems. In fiscal year 1984, we have added the Multiple Launch Rocket System (MLRS) and the Apache attack helicopter (AAH) to the list of programs stabilized within the Army.

Multiyear contracting. Multiyear procurement is an acquisition tool which can lead to reduced costs, prevent program stretchouts, and ensure the early fielding of new systems. The Army has long recognized the potential benefits of this tool and has used the multiyear approach in the past for components and nonmajor systems. Your actions in expanding the authority for multiyear contracting enabled us to award a multiyear contract for a major system for the first time—the Black Hawk helicopter airframe—in fiscal year 1982. The three-year contract is expected to save the Army over $80 million. The Black Hawk engine, the CH-47D helicopter, and the multiple launch rocket system were among our fiscal year 1983 nominees for multiyear awards. We are positive about multiyear contracting and plan to continue its use, but we recognize that it is not suited to every materiel acquisition program. A selected system must have validated cost savings based on a side-by-side comparison with a yearly procurement program. The systems must also have a stable design and a lower overall unit cost under the multiyear approach. We know that anticipated savings are not automatic, and we are proceeding cautiously so that we select the right acquisition strategy for each program.

Program management control system. The Army is currently implementing the program management control system (PMCS). PMCS will increase stability by bringing better discipline to the materiel acquisition process, increasing the visibility of program trends, and identifying programs which need more intensive management. Thirty-seven systems are presently scheduled to come under PMCS. Each will be baselined for cost, schedule, performance, quantity, production capacity, and integrated logistics support requirements. The systems will be tracked by a monthly report to detect deviations from baselines. An important feature of PMCS is that the baseline program cannot be changed without the formal approval of the Department of the Army and the Materiel Development and Readiness Command (Darcom).

Long-range planning. The Army has developed a long-range research, development, and acquisition plan to provide a focus for—and lend stability to—the materiel acquisition process. It is based on interactive and analytical considerations of future Army needs and future technological and engineering capabilities. The plan provides the Army's leadership a means by which to consider the future implications of current decisions. It facilitates the making of timely, logical, and economically sound decisions for the acquisition of materiel with a minimum of program disruption.

Better management information is the key to identifying unfavorable trends and potential problem areas while effective corrective action can still be taken. Our efforts include the following activities:

Cost risk review. The Army has established a cost risk team which is responsible for examining systems that are approaching milestone reviews. This team of experts visits contractors and takes a hard look at the risk factors. A cost risk assessment is then provided to the decisionmakers. To date, risk reviews have been conducted on the Sergeant York air defense gun, the position location reporting system (PLRS), and the remotely piloted vehicle (RPV), and are in progress for Pershing II, the maneuver control system, and the single-channel ground and airborne radio system (Sincgars).

Expanded SAR reviews. The Army has initiated an expanded quarterly review at which the cost, schedule, and performance variances of those systems included in the selected acquisition report requirement are examined. The review, which is conducted by the Under Secretary of the Army and the Vice Chief of Staff, highlights problem areas and assigns responsibility for follow-on action.

Monthly program's status report. The monthly program status report begins with the program manager's candid assessment of where his program stands. The Department of the Army staff then takes this information and adds to it other factors of which it is aware. Necessary actions are taken by the appropriate staff agency and the report is provided to the Under Secretary of the Army, the Chief of Staff and the Vice Chief of Staff.

Better and more frequent cost estimates are the key to staying abreast of program costs and minimizing unprogramed, unanticipated cost growth. The following initiatives are expected to upgrade our cost estimate record significantly:

Annual estimates of major systems (program manager and independent). In the past, cost estimates were prepared only for each milestone decision review. Between reviews, the normal procedure was to accept the program manager's updated baseline estimate as the basis for budget formulation. As a result, we often went for a period of years between updates. Our procedure is being modified to require annual baseline and independent estimates of all major systems.

Comparison between independent and program manager estimates. The two estimates will be compared, and the higher estimate will normally be used for costing and budgeting purposes. Exceptions will require approval by the Secretary of the Army.

Improved cost estimating. In addition to conducting estimates more frequently, the Comptroller of the Army has initiated a 5-year program to upgrade cost analysis techniques and the data base on which they rely.

A better transition from development to production is needed to minimize the cost growth we have consistently experienced during this phase of the acquisition process. We recognize that in the past, insufficient emphasis has been placed on the critical development-to-production transition. We are working to remedy that shortcoming through actions such as the following:

Better production and logistics planning. Production and logistics planning must be done throughout R&D, not just immediately before the start of production. We plan to adequately fund production and logistics planning and manage them well by tracking expenditures in the program management control sytem. This will insure that the program manager has enough dollars and is using them as intended.

Define production risks and translate them into dollars. The concept of holding risk money for application during R&D has been in use for a number of years. An extension of this concept involves providing risk dollars for the transition into the production phase. We believe that solving production difficulties as soon as they materialize will keep them from developing into full-fledged problems, thereby saving dollars in the long run.

Preplanned product improvement (P^3I) is intended to reduce development risk and cost, and to take advantage of the improvement potential which exists for new or fielded systems. The use of evolutionary alternatives rather than the development of a new system to meet a threat is a management principle which the Army has followed for some time. The product improvement (PI) programs we described earlier were based on evolutionary changes and contributed to program stability by making the system change process more systematic. The P^3I concept will enhance the product improvement approach by enabling us to plan early in the acquisition cycle for block improvements that will be needed and technologically available in the future. P^3I is an important element in the Army's determination to make the best use of what we have, while giving us needed development time to consider future requirements and preclude the use of high-risk or unproven technology.

We believe that these and other management initiatives will pay off with lower costs and a more responsive acquisition process. However, we will need your continue support. For example, multi-year procurement is an acquisition management tool that can yield substantial dividends. Increased funding in the early stages of production can lead to savings because of economic-order purchases and capital investments by industry. Planning for production and funding for production risk also take dollars at a relatively early point in the total acquisition cycle. For these programs to be successful and fully realize their potential in cost savings, continued fiscal support from Congress is necessary.

The Army's long-range planning process was mentioned previously in connection with our efforts to stabilize the acquisition process. Our long-range plan also provides focus for the Army's technology efforts and overall research and development program. This is extremely important, since we must rely on our technical capability in order to overcome Soviet quantitative and qualitative superiority. R&D funds are truly seed money for the future.

This year's long-range plan covers 15 years—fiscal year 1985-1999—and lays out how the Army will develop and acquire the materiel it will need to fight in the 1980's, 1990's, and beyond. It also allows us to examine affordability early in the development process. As part of the plan's formulation, Army staff planners look to both the combat developer, who speaks for the soldier in the field, and the materiel developer, who analyzes our technology. In this fashion, the long-range plan balances our needs with production opportunities and capabilities. This balance insures that we are on the correct path to achieve the global response capability our army requires.

The Army research and development program include basic scientific research and exploratory development (referred to as our technology base) and developmental and engineering efforts directed toward improving current systems, and fielding new weapons and equipment in the near future. In the fiscal year 1984 budget request, we allocate approximately 15 percent of our research and development funds to the technology base and the remainder to developmental and engineering efforts.

The battlefield of the 1990's and beyond will require Army Forces that are light, agile, and lethal. These forces will have to fight a very "fluid" type of combat, often operating independently from other forces. They will have to fight outmanned and outgunned. To meet the challenges of the 1990's and beyond, the Army will place greater emphasis on "leverage" technologies which offer the potential for innovative, revolutionary change in military systems and capabilities. Examples of such technologies include:

VHSIC (very high speed integrated circuits) that will provide substantially smaller, lighter, and faster computers and processors;

Infrared focal plane arrays, integrated optics, and image-processing techniques that will greatly improve sensor capabilities to detect and identify targets;

Millimeter wave technology that will guide beam rider and terminal homing missiles and artillery rounds through smoke, fog, and dust;

Biological technologies that can be used to develop detection systems, vaccines, and antidotes;

Artificial intelligence and robotics that can be used not only to increase machine capabilities but also to reduce human time and effort.

The Army's new thrusts in technology are designed to integrate, focus, and apply leverage technologies and other existing technologies in the following areas:

Very Intelligent Surveillance and Target Acquisition (VISTA) technologies will get much better targeting information to unit commanders in near realtime. Technology demonstrations will include ground and aerial VISTA platforms and a mobile ground combat information center.

Distributed command, control, communications, and intelligence (DC3I) technologies will dramatically improve reliable distribution of battlefield information among all levels of command. Technology demonstrations will include distributed command and control networks and VISTA communications networks.

Self-contained munitions technologies will allow munitions to autonomously search out, select, and home on hostile targets. Technology demonstrations will include a fiber optic-guided missile, quiet radar for air defense systems, and a helicopter air-to-air self-defense gun system.

Soldier-machine interface technologies will improve training, expand individual capabilities, and make it easier to operate sophisticated equipment. Technology demonstrations will include intelligence displays in combat vehicles, training devices, and robotics devices.

Biotechnology offers the opportunity to assist in the prevention and treatment of casualties through new classes of vaccines, antidotes, and treatment compounds. Technology demonstrations will include a system for detecting chemical and biological agents, systems for rapid identification and diagnosis of disease, and various new vaccines.

Our developmental and engineering research and development efforts are oriented toward the fielding and improvement of specific systems, rather than toward the general research and testing supported in the technology base.

Such directed efforts have resulted in the development of new systems across the entire spectrum of our mission areas—the M1 tank and Bradley fighting vehicles, the Apache attack helicopter, the Patriot and Stinger air defense missiles, the multiple launch rocket system, and many others. Additional systems such as the Pershing II and the fire support team vehicle (FISTV) are in the final stages of development. In addition, research and development funds support the improvement of existing systems. Such improvements range from the development of a particle separator to protect the Cobra helicopter's engine from sand and grit, to the block improvements projected for the Abrams tank.

The importance of an adequate research and development program has seldom been greater. Today, the Soviet Union supports about twice the effort that we do in military research and development and is graduating five times as many engineers as we are. The quality of their weapons has continued to improve because of their past R&D investment, and, due to the size of their present program, we are now faced with the additional risk of technological surprise. With your support, we will prevent that from happening.

At this time, I would like to begin the discussion of selected systems, organized by mission areas. I will be assisted by MG Wagner, the Army staff director of requirements, who will briefly describe each mission area in terms of how we operate and what we need to accomplish the mission. A topic outline of my briefing is provided for your convenience:

Close combat

Abrams Tank: Description; program highlights; and financial summary.

Bradley Fighting Vehicle: Description; program highlights; and financial summary.

Apache Attack Helicopter: Description; program highlights; and financial summary.

Hellfire Antitank Missile: Description; program highlights; and financial summary.

Army Helicopter Improvement Program (AHIP): Description; program highlights; and financial summary.

Viper: Description; program highlights; and financial summary.

Fire support

Pershing II: Description; program highlights; and financial summary.

Multiple Launch Rocket System (MLRS): Description; program highlights; and financial summary.

Joint Tactical Missile System (JTACMS): Description; program highlights; and financial summary.

Copperhead: Description; program highlights; and financial summary.

Remotely Piloted Vehicle (RPV): Description; program highlights; and financial summary.

Joint Surveillance and Target Attack Radar System (JSTARS): Description; program highlights; and financial summary.

Fire Support Team Vehicle (FISTV): Description; program highlights; and financial summary.

Field Artillery Ammunition Support Vehicle (FAASV): Description; program highlights; and financial summary.

Air defense:

Patriot: Description; program highlights; and financial summary.

Antitactical Missile (ATM): Description; program highlights; and financial summary.

Sgt. York Air Defense Gun: Description; program highlights; and financial summary.

Stinger: Description; program highlights; and financial summary.

Combat support/combat service support

Black Hawk Helicopter: Description; program highlights; and financial summary.

Chinook Helicopter (CH-47D): Description; program highlights; and financial summary.

High Mobility Multipurpose Wheeled Vehicle (HMMWV): Description; program highlights; and financial summary.

Commercial Utility and Cargo Vehicle (CUCV): Description; program highlights; and financial summary.

Single Channel Ground & Airborne Radio System (SINCGARS): Description; program highlights; and financial summary.

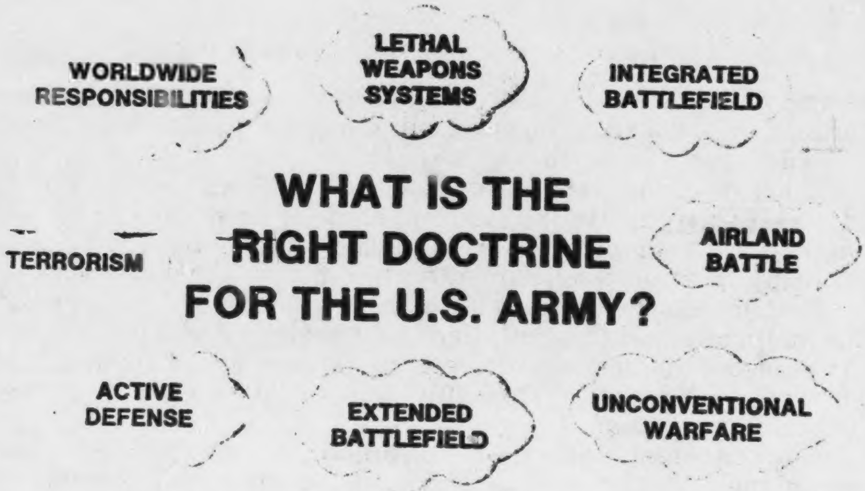
Position Location Reporting System (PLRS): Description; program highlights; and financial summary.

General **Merryman**. I would like to introduce Maj. Gen. Louis Wagner who replaced Lieutenant General Menetry who was here last year as Director of Requirements in the Army. General Wagner will give a short overview on how we plan to use the systems that I will discuss following his presentation.

STATEMENT OF MAJ. GEN. LOUIS WAGNER, DIRECTOR OF REQUIREMENTS, OFFICE OF THE DEPUTY CHIEF OF STAFF, OPERATIONS AND PLANS

General **Wagner**. Mr. Chairman, it is a pleasure to be here today.

I am going to discuss with you basically three areas that I am deeply involved in as Director of Requirements for the Deputy Chief of Staff for Operations and Plans. First doctrine; second, force structure; and finally, prioritization of these systems that we are going to discuss today and very briefly how they are used on the battlefield.


WORLDWIDE RESPONSIBILITIES
LETHAL WEAPONS SYSTEMS
INTEGRATED BATTLEFIELD
WHAT IS THE RIGHT DOCTRINE FOR THE U.S. ARMY?
TERRORISM
AIRLAND BATTLE
ACTIVE DEFENSE
EXTENDED BATTLEFIELD
UNCONVENTIONAL WARFARE

DEVELOPING DOCTRINE

Developing doctrine is complicated for the Army. It is complicated for a number of reasons, basically because of our global requirements. We have to be prepared to counter terrorism in various parts of the world, we have to be able to fight that massive war that may occur on the European Continent and we have to be prepared to participate in unconventional warfare and warfare at lower levels in other parts of the world.

Doctrine must tell soldiers today how to fight tomorrow in support of the national strategy with weapons designed yesterday against an enemy with a presumed capability.

To do that we have developed doctrine which tells us how we are going to fight. But that is not simple because we are trying to replicate by models, by war games, by maneuvers, in peacetime, how we will fight in wartime. That is always difficult.

We must get as close as we can, however, if we are to train our people properly so that they can execute our doctrine the way we feel they should in wartime. The basic manual in this area is FM 100-5, our operations manual which lays out the air-land battle and how we plan on fighting through the rest of this century.

Senator GOLDWATER. First of all, I think that 100-1 is a tremendous improvement over what we have had for too many years.

Are you satisfied in the Army that we have an understandable national strategy on which the forces can work and develop their tactics and strategy?

You mentioned the need to be prepared to fight on the possible battlefields of Europe and other areas of the world.

Are you satisfied that we have an understandable national strategy?

TYING OUR MILITARY SERVICES TOGETHER

General **Wagner**. As I understand your question, sir, I believe you mean are we tying together all of our military services to fight this battle the way we think we should.

We are working very hard now with the Air Force, with the Navy and with the Marine Corps so that we do work all four forces together. For example, the Vice Chiefs of Staff of the Air Force and the Army meet on this frequently. In our own office we work with the doctrinaires in the Air Force because it is an air-land battle and we understand they will fight that battle with us.

One of our highest priorities is to get our forces to that battle. We work with the Navy and fully support their efforts to give us the sealift that we need to get us there.

We are working with them continually. For example, we have briefed the Secretary of the Navy on the air-land battle doctrine and he said that he basically agrees with the concept. He has asked that the Navy get involved in it.

Senator **Kennedy**. We haven't heard these priorities, as you've explained, from the Air Force or the Navy when discussing deployment of the Army's Rapid Deployment Force. For example, you clearly have priorities. But when the other services come before us and present their laundry list they may not place your priorities as high up.

I suppose this is an example of where there may be some difference. Maybe it isn't. How that is worked out, however, is enormously important to joint operations.

Senator **Goldwater**. I think the Senator has made a very good point. I was going to raise it. For example, the Air Force the other day in direct testimony and off-the-record testimony admitted to a deficiency for M-Day lift of about [deleted] percent.

In other words, we are talking about trying to get a division overseas in maybe 10 days. [Deleted] the Soviets have demonstrated their ability to airlift divisions in a matter of 3 or 4 days to most of the battlefields we have been talking about.

Now, this is not your problem, but this touches on the question I have asked all the services, asked the Chairman of the Joint Chiefs. General Vessey said he didn't think that they had a national strategy that was all-encompassing. In other words, the Air Force inability to lift you is part of this, the Navy's inability or ability to lift you. Ninety-five percent of your lift for war will be by sea. We have been deficient in this, in my opinion, for many, many years.

I am glad that you are working on it.

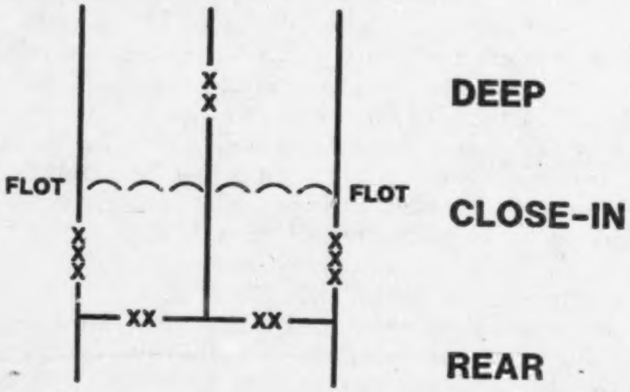
SEALIFT AND AIRLIFT

General **Wagner**. Sir, we are deficient today. As you well know, we are getting the SL-7's that are being converted for the Navy, but they are not going to be here for several years to give us additional lift. Even that won't give us the capability that we need.

I am going to point out one of the procedures we are working on to try to get around this, but without sufficient sealift and sufficient airlift we cannot get there with the forces we need in Europe or to the contingency areas. That is the reason we support their efforts in both the sea and the airlift.

AIRLAND BATTLE

DEFINES THE EFFORT AS ONE BATTLE WITH THREE PARTS.

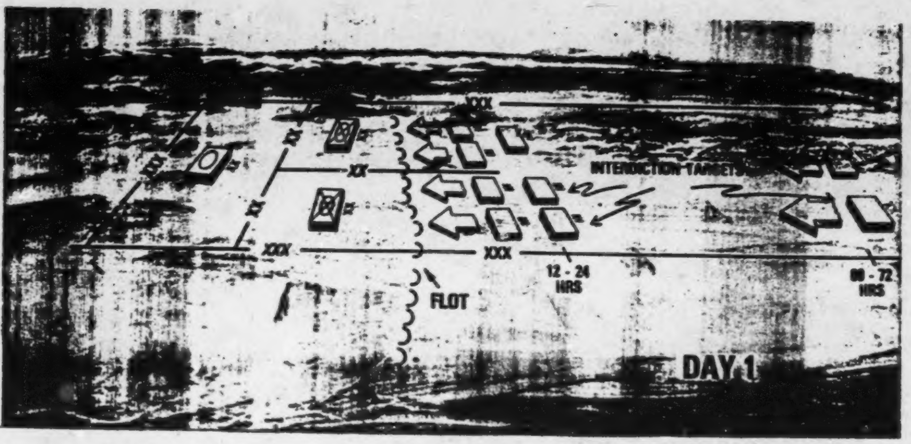


The air-land battle as we see it is not a battle at the front lines as we have thought in wars of the past. It is simultaneous fighting, deep, far into the enemy rear at the forward line of troops or the FLOT, as you see it there, which is a close-in battle and in our rear because our potential enemies have a great capability to move their forces into our rear and upset our command and control if they do that.

I would point out, however, although we have the deep and the rear battle, the final decisive battle will be fought at the forward line of troops just as it has been in previous wars.

AIR-LAND BATTLE APPLICATION

To give you some idea of how this works, I am going to go through a very short scenario. It doesn't go into the great detail and all the planning that would be necessary in a battle, but I think it will give you some feel of what we are talking about.



Very basically, this depicts how we would fight a typical battle in Europe. On the left side, we have a typical U.S. Corps, three divisions, two of which are mechanized divisions and one is an armored division. Facing them is a Soviet or enemy army of four divisions. They have two divisions up on the north and two in the south, and they have their follow-on divisions in their second echelon.

Following this would be another army just like that because they want those forces to exploit any place that they break into our lines. The key to air-land battle is that we have to take the initiative and make them fight the way we want to fight instead of being reactive as we have often planned in the past.

Early in the stage before the battle is joined our intelligence capabilities would start following their follow-on forces and at the start of battle start we would start interdicting them back there.

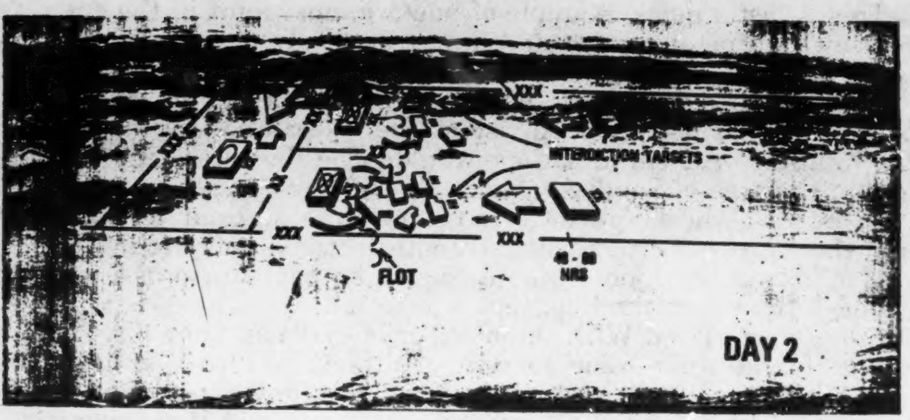
Today we do not have the capability in the Army in many cases to detect them there or to interdict them and we have to depend on the Air Force for that.

Senator GOLDWATER. Let me ask you a question.

This, of course, has been a historic concept of land battle. Have you had any indications lately that they may be changing that concept?

General WAGNER. Yes, sir. And I am going to discuss that on the next two charts.

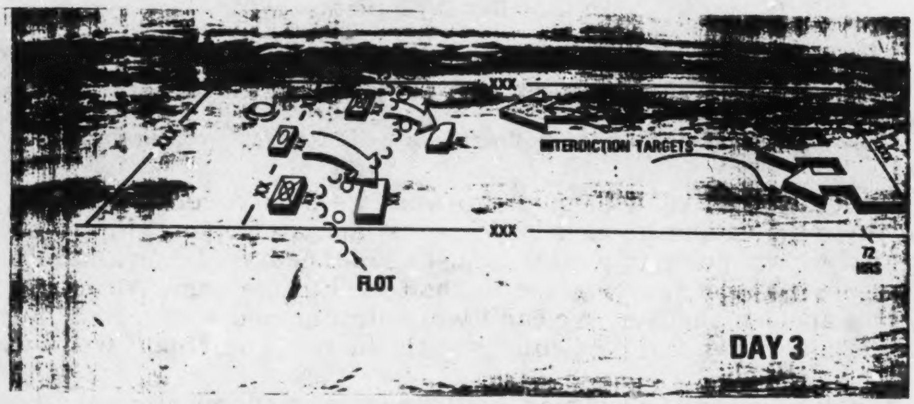
If you read their doctrine, which we do, sir, they still follow that concept, but they have added something called operational maneuver group with which they can exploit by planning in advance so that they just don't attack by putting bodies on top of bodies.



As the battle is joined here, if you look at the arrow up here, we envision this would be part of an operational maneuver group coming to strike in our rear to upset our command and control and upset our plan of battle.

As the battle is joined, you see the enemy division in the south starting to penetrate. When they penetrate in that fashion the following echelons will immediately move forward to assist them to exploit. Our forces in the north have held them, so when our corps commander looks at this he sees an opportunity to do something to them before they can bring in all their following echelons.

What he proposes to do is to hold their rear attack with minimum forces, take his reserve division, which is absolutely necessary in fighting this battle, to hit into the flanks of the penetration on the south and if that is to be successful, he must absolutely slow down the following echelons on the north to fight that battle.



As the battle moves in, it goes according to plan quite obviously because that is a scenario, sir. The reserve division was able to attack into the penetration and destroy them while the one on the north, since the follow-on forces were slowed down by interdiction, was able to hold while minimum forces held the maneuver group in the rear.

This is just a quick example of how we must fight in the enemy's rear at the line of contact and in our own rear if we are to be successful in the air-land battle that we plan to fight in the future.

Senator **Goldwater**. To me the secret of the Soviet land battle concept is that big pile of divisions that is still coming in. I think the infantry problem in Europe wouldn't be the same kind of problem in the area of Saudi Arabia.

In Europe where you have massive forces and our lesser forces and their great overpowering strength in tanks and artillery gives you fellows a hard job. I would like to be kept up to date on any changes you see in their concept of attack.

General **Wagner**. With the number of divisions they have today, sir, as far as their basic concept of attack, we see that they are going to keep following up to exploit where they make their breakthroughs. The principal change we have seen is in their operational maneuver groups where they want to get into our rear, strike us at the flanks or confuse us before we can take action to get to their rear units.

When I say we are going to fight the battle deep, we are not talking about a battle of attrition back there. We can't destroy all the tanks that they are going to have following.

Second, they probably are not going to be massed enough so that we can do that. So what we have to destroy are their command control and nodes, and their logistic ability back there, to confuse them and keep them from employing their forces like they want to do.

General **Merryman**. Senator Goldwater, your perception is correct. You are going to find two of the systems that I will discuss later, JOINT STARS and JTACMS, are two of the things that we need to get for the Army so that we can handle those preponderant number of Russian divisions in the second echelon.

AIR-LAND BATTLE SUMMARY

Attacking deep, rear area operations, and close-in fighting are inseparable.

Attacking deep and successful rear area operations are essential to winning.

The decisive battle will be won with maneuver to bring attacks against the enemy flanks and rear.

Planning for nuclear-chemical-electronic means is conducted concurrently with conventional planning.

General **Wagner**. This sums up what we have covered. We fight in three areas simultaneously. We must attack deep and into their rear if we are going to win. We must use maneuver. Unfortunately, some of the defensive plans we had in Europe some years ago forgot about maneuver. We can't win outnumbered without making use of maneuver and particularly with the new equipment we have today.

Finally, we must also plan for nuclear and chemical means because that could spring on us any time in a battle we are fighting.

Senator **Kennedy**. Do your procurement requirements reflect this strategy outlined today in regards to the various weapon systems?

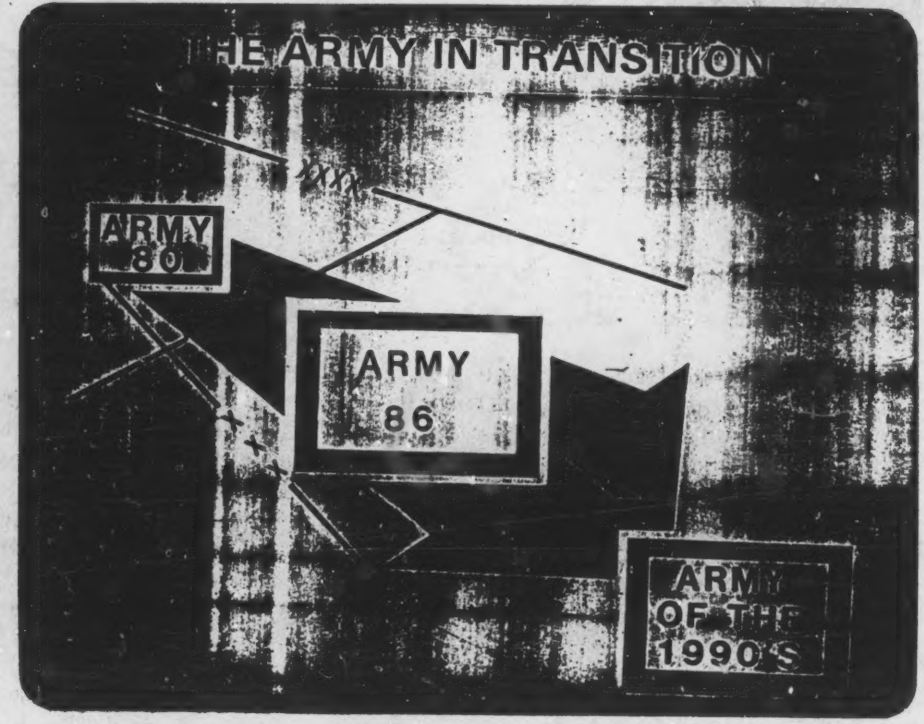
General **Wagner**. Yes, sir, it does. I am going to show you what these weapons are in a few minutes. We prioritize them with respect to how we plan to attack the enemy.

Senator **Kennedy**. Is that a reasonable criteria for us to use in trying to evaluate where priority items fit into this particular scenario?

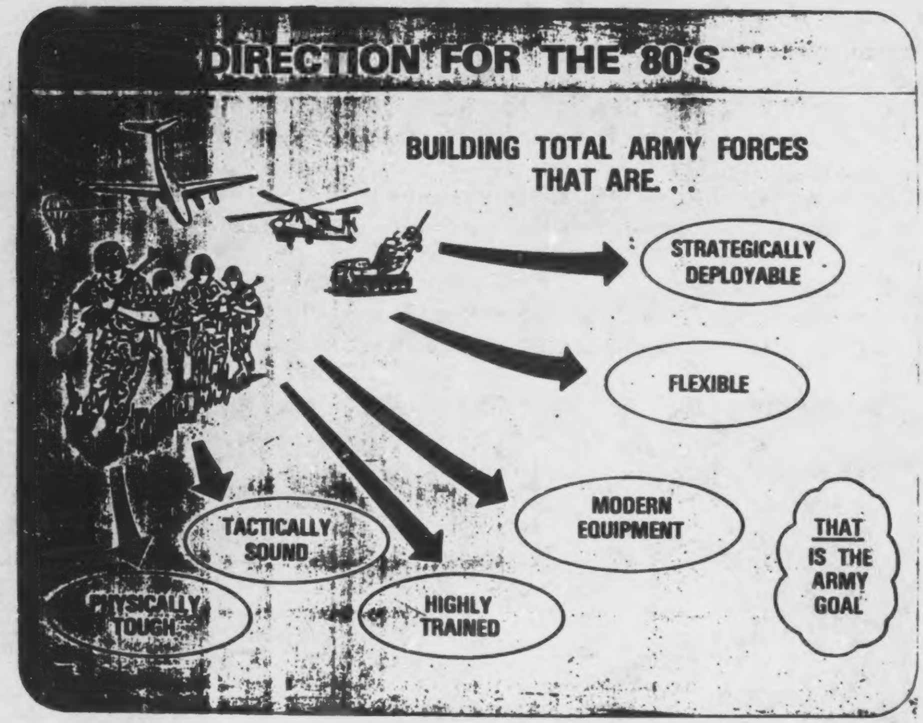
General **Wagner**. Yes, it is because that is how we came up with our priorities on which are the important systems, and the part they will play in that battle.

Senator **Kennedy**. Will these systems give you the extra capability to meet the responsibilities and challenges that you have outlined?

General **Wagner**. Yes, sir. We can have the greatest doctrine in the world, but if we don't have the force structure and system to properly utilize that doctrine, we are not going to be successful.



This next chart shows us where we are going to go. We are in the greatest period of transition we have ever gone through in the U.S. Army, including World War II. We are looking at doctrine to win that battle. We are changing our force structure that I will show you and we are getting new equipment to properly fight that battle.


DIRECTION FOR THE 80'S
BUILDING TOTAL ARMY FORCES THAT ARE . . .
STRATEGICALLY DEPLOYABLE
FLEXIBLE
MODERN EQUIPMENT
TACTICALLY SOUND
PHYSICALLY TOUGH
HIGHLY TRAINED
THAT IS THE ARMY GOAL

In putting together our force structure we look at these basic tenets. First of all, it must be strategically deployable. Many of our divisions are not deployable today because of the shortage of sealift and airlift as we talked about previously and also because they are just too heavy.

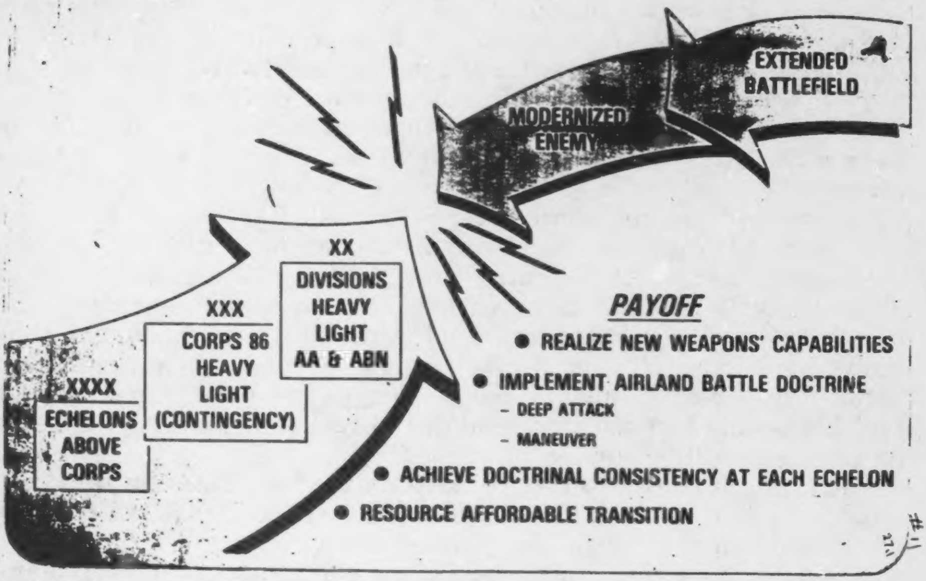
So, I am going to discuss what we are doing about that. Our units have to be flexible because as I pointed out, we must fight in all parts of the world. If we are to use the modern equipment that is coming to us, we have to organize our units and our doctrine to get the most out of it.

For example, it does us no good at all to have an M-1 tank with superior shoot-on-the-move ability and its cross-country capability, if we don't utilize that in maneuver to get into the enemy's flanks and rear when there is a possibility to destroy him there. We have to train our people so they are flexible on the battlefield. The leader has to know what initiative is required and be trained to react.

I just came from the Armor Center Training School. We are working very hard to get the lieutenants and captains trained in this doctrine so that they understand how to react quickly and carry out our missions.

Finally, we have to be physically tough because it is the man who wins the battle, whether he is in a tank or walking on the ground.

FORCE DESIGN. . .
ARMY 86



PAYOFF

- REALIZE NEW WEAPONS' CAPABILITIES
- IMPLEMENT AIRLAND BATTLE DOCTRINE
  - DEEP ATTACK
  - MANEUVER
- ACHIEVE DOCTRINAL CONSISTENCY AT EACH ECHELON
- RESOURCE AFFORDABLE TRANSITION

#11

In putting our organizations together we started at the lowest level, went through the division corps, and echelons above the corps. We looked at heavy divisions which are mechanized or armored divisions, the light infantry division, air assault division and our airborne division. All of these play a part in our overall strategy for the Army because of the missions we must perform throughout the world.

Heavy Division 86—Objective

Design a division organization capable of defeating the threat of the 80's by: Incorporating new systems under development; integrating advanced battle concepts derived from the threat and new systems; and optimizing human resources within affordable manpower constraints.

First of all, let us look at the heavy division. This is the first one that we developed and organized in TRADOC because it is the one that will be utilized in Europe where we have our greatest threat. Basically these are the tenets that we base that development on. The last one is very important. Our equipment today, in some cases, can be utilized 24 hours a day and if we don't optimize the human aspect of it so that he can operate that equipment 24 hours a day, we are not getting the full capability out of it.

Heavy Division 86—Design Principles

Maximize firepower forward.
Improve combined arms maneuver capability.
Increase leader to led ratio.
Division defeats engaged forces and delays, disrupts, and attrits following echelons on an integrated battlefield.

Arm, fuel, fix, and feed forward.
Continuous combat operations.

We have looked at how to fight and how to organize to get that better capability. These objectives lead to the design principles you see here.

Obviously if it is a heavy division, we must have the maximum fire power available forward at the decisive point in the battle. In improving combined arms maneuver capability, we tried to simplify the job for the lower unit commander. In other words, if you give him a very complicated organization to lead, he is going to have difficulty synchronizing all those parts. So we simplify those organizations.

The tank company commander will often fight his company by itself instead of having to worry about mortars, infantry, and all these other forces. At the same time, however, there will be times when he will have to fight with a combination of infantry and armor and we split our training of our officers to make sure they know how to employ both. We are increasing our leader to led ratio. Every war in history has shown if you have a good leader and his people can see that leader and feel that leader's influence on them, he will be successful.

For example, in that area we have reduced the size of a tank platoon from five tanks to four tanks, and we use what we call the wingman concept. When the platoon leader reacts a certain way, the rest of them react just like fighter pilots have done for many years. We have watched the Israelis use this in their war, and they have been successful in doing that. We ran a test and found out that was the way to go.

Finally, if you come down to the arm, fuel, fix, and feed forward, we have overlooked that in the past. If this force is to fight 24 hours a day, we must have the capability of constantly supporting them. To solve that problem, we have actually formed battalions to support brigades. They will habitually work with the same brigade so that they practice in peacetime the way they will have to support them in wartime.

However, as we look at the problems in developing the forces for our Army, we have found that the heavy division is not the only one we need. Our light divisions were actually so heavy and took so much transport to move that they were not flexible and could not be used in contingency operations.

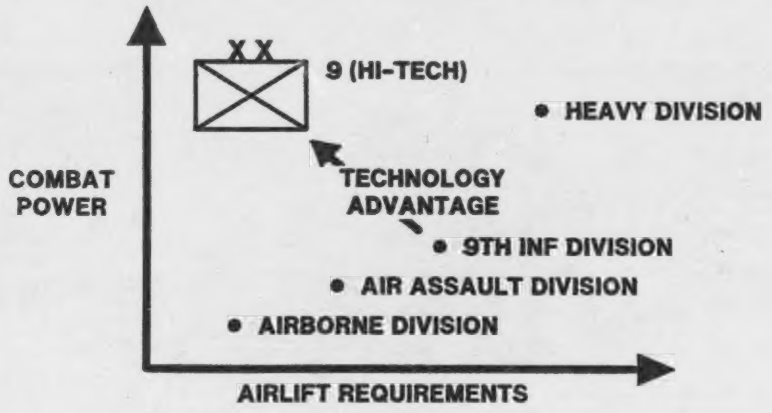
HTTB GOAL

To field a prototype strategically deployable, lean, hard-hitting, and sustainable high technology light division (HTLD) in 1986.

We have been looking at what we call the high technology test bed. We have taken our 9th Infantry Division at Fort Lewis, Wash., and converted it into a high technology, light division with several goals in mind.

One is to reduce the number of air missions it would take to transport this division to 1,000 C-141B missions. This is even lighter, for example, than to move an airborne division. If we can do that, it will have a lot greater flexibility.

DIVISION COMPARISON



Really our goal in that, if you look at this chart, is to compare airlift requirements with combat power. If you look at the divisions we have in the Army today, we have an airborne division which doesn't have a great deal of airlift requirement when compared with your air assault division which is our 101st Division or our heavy division, but it does not have the combat power because it does not have the heavy antitank capability or things of that nature.

What we are trying to do with the 9th is to move back on the airlift requirement and move up on its capability to get as close to that heavy division as we can. Quite obviously, that is very difficult because there is no way that we are ever going to give it the firepower and keep it within 1,000 aircraft airlift capability.

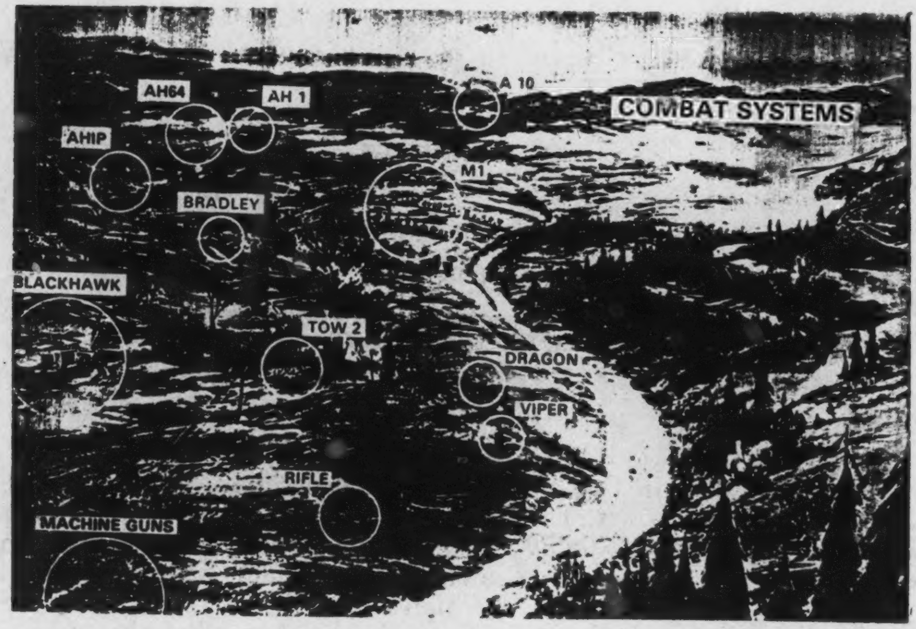
We feel by some of the new innovations, the light vehicles, for example, we will give it mobility. By using some of the new innovations in weapon systems, we can raise that combat power while at the same time dropping back in airlift requirement. We are working very hard on that. To do that we take an innovative means of buying things off the shelf and then going out and trying them. We have been helped by the research and development community in buying these items without going through long development programs.

So we are learning two things. We are coming up with a light division, but at the same time we are becoming more innovative in our procurement techniques.

THE AIR-LAND BATTLE

I would like to transition to how all of these pieces you are going to see General Merryman explain today will fit together on the battlefield so that we can fight the air-land battle.

To do that I would like to take this section of terrain, it could be out of any place in the world. In this particular case I said let us take a section out of Central Europe and take a look at how we would use these pieces of equipment on the battlefield.



This is a busy chart. I am not going to explain all those systems, but what it shows you is that there is a synergistic effect between these battlefield fighting systems so that we all fight together. For example, the rifleman is shown down here. He is still extremely essential. In fact, if you look at the European environment today, we talk about the need for tanks, yet there is a tremendous need for infantrymen because of built up areas. There will always be the rifleman to hold the ground. You have short-range weapons to destroy tanks. At longer range, you have Black Hawk helicopters to give you mobility on the battlefield, your scout and aerial observer for the artillery, attack helicopters, Bradley fighting vehicles and also the Air Force systems because all of these must fight together in that close-in battle.

Senator Goldwater. Where does the destruction of the enemy airfield come in? Is that under your responsibility or joint responsibility with the Air Force?

I am thinking now of the Pershing-type missile that can knock out air bases.

General Wagner. That would be a combination of the Army and the Air Force. Today most of the knocking out of those airfields is an Air Force responsibility. As we do get some of the longer-range missiles, that could well be one of their higher priorities because we have to knock out those airfields if possible to stop the overwhelming air power that they have today. It is joint action.

Senator **GOLDWATER**. I remember a war game I watched, but we didn't destroy their forward air bases. A land battle could not last more than 3 days.

Is that about right?

COMBAT ENGINEERS

General **WAGNER**. That is about right, sir, as far as I know.

One thing that is often overlooked, unfortunately, in both force structure and in equipping is the part that the engineers play with the maneuver forces. We cannot win a battle in any part of the world if we do not have the engineers to give us the mobility capability and to help us build the obstacles to stop the enemy.

Some of the equipment they use will be the M-9, ACE, combat engineer vehicles and their armored vehicle launched bridges to give us the mobility that we need.

FIRE SUPPORT

Our fire support, and here I am basically talking about indirect fire support, runs from the borders which are up front, field artillery and multiple launch rocket systems, to the rear units JTACMS and Pershing II. They are not necessarily shown in specific depths because those can vary as to where you can place them, but we need this total umbrella. We need these to fight the close-in battle, and JTACMS and Pershing to get back to the second echelon.

AIR DEFENSE

Just as we need fire support we need an air defense system that starts with the point air defense of the man on the ground with his Stinger. The DIVAD gun, which will be right up with our tanks and our fighting vehicle systems, gives us close anti-aircraft support against fixed aircraft wing and helicopters.

Then we have to have an umbrella provided by Patriot, I-Hawk and Chaparral on that battlefield. One of the key issues in the entire air-land battle is going to be our capability by electronic means to determine what he is doing in his rear. Although we have been working on this for a number of years, these systems are just beginning to come to fruition in some areas. We cannot fight that air-land battle if we don't know what he is doing deep to our front.

INTELLIGENCE AND ELECTRONIC WARFARE

The corps commander needs to know what he is doing 300 kilometers away. The division commander is interested in about 150 kilometers out there. That does not mean he is going to be fighting that far, but he needs to know what is going on.

One of the systems to do that is the man and I have to tell you in some cases that is about all we have today, that man on the ground looking out there. He is very important.

In our force structure we are adding long-range capability in the human area to get him out there because sometimes the eye is better than electronic means to see what the enemy is doing.

We have the RPV's, Quickfix, and JOINT STARS programs that General Merryman alluded to. The JOINT STARS program is essential to give us a moving target indication [MTI] of what that enemy is doing when he closes, anywhere from [deleted].

We are developing JOINT STARS jointly with the Air Force which will be an important radar. [Deleted.]

Finally, we have our own intelligence capability or Guardrail.

COMMAND AND CONTROL

Command and control on this battlefield, this fluid deep and rear area battlefield, is absolutely essential. We must have the communications equipment to do that properly. Some of the systems that you will see in our budget, SINCGARS radio, for example, will be our standard tactical radio that will be used down to the platoon level.

As you go back you will see microcomputers helping the commander to make decisions and pull together the information he needs. We will make use of tactical satellites communications to be able to talk over long distances, either digitally or voice.

Finally, we have to have the multichannel network in our corps and divisional areas.

Senator **Goldwater**. Are you keeping ahead of communications? We are in a situation right now where the development of communications is going so rapidly that what we buy today is obsolete tomorrow. I have seen some of your equipment. I am just wondering if you are keeping up with it, Doctor, in your knowledge of communication development?

Dr. **Sculley**. It is probably the most difficult field to keep up with. We currently operate with radios that are technologically 20 years in age, but will soon be fielding gear that we feel that is state of the art, the best that is commercially available in the country and should serve us well into the nineties.

I think we need to be careful we don't make the same mistake in the future in waiting so long to upgrade our communications equipment.

Senator **Goldwater**. It is getting rather touchy even in civilian communications. What we buy today is obsolete tomorrow. It is going to keep on that way.

General **Wagner**. As a user, sir, I think we can become oversophisticated in that area, particularly at the platoon level. One thing we are looking at in Training and Doctrine Command is the determination of can we use a cheaper, almost off-the-shelf radio in the platoon instead of having everyone with the expensive SINCGARS.

From an affordability aspect that is the answer. Also it would be cheaper to buy it and throw it away than having to repair them. I think that is where we are going to have to go where they are being proliferated in large numbers.

Senator **Goldwater**. I would like to welcome Senator Kennedy. I don't think I have ever had a member of the committee work so hard to get background. I know what you have been doing in your spare time. I appreciate it.

I was glad to see that the Secretary of Defense is talking about downgrading the classification of what we know about the Soviets. Not for that purpose, but because our meeting yesterday was so interesting we are going to see if the chairman of the full committee will approve an open meeting for all Senators to attend the same briefing.

It would be very valuable, particularly this year when all of us feel we have to make cuts.

I want to welcome all the members. This is the greatest attendance we have had. Anytime you want to say anything, just jump in.

COMBAT SERVICE SUPPORT

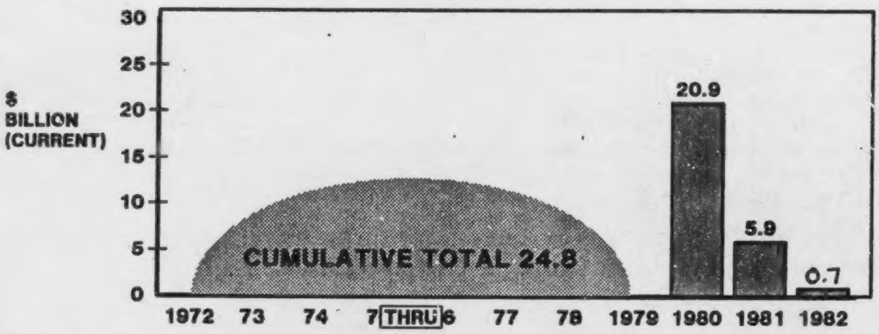
General WAGNER. Finally, sir, as the Secretary pointed out, one of our most serious deficiencies in the past has been the capability of supporting this from the combat service support end.

You will see many items in our budget today to do that from the frontline vehicles, commercial vehicles, the vehicles that will support us again in our front lines back to our line hauls in the rear. We need this capability if we are to fight the air-land battle successfully.

STATEMENT OF LT. GEN. JAMES H. MERRYMAN, USA, DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT AND ACQUISITION

General MERRYMAN. Sir, before I start discussing systems, I am sure you can use good news, as well as we ourselves can, because mostly we get bad news.

COST GROWTH HISTORY
SAR SYSTEMS



	THRU 1979	1980	1981	1982
COST GROWTH	24.8	20.9	5.9	0.7
SUM TOTAL	24.8	45.7	51.6	52.8

I wanted to show you this chart because it is quite different from the story I had to tell you last year. What it shows you is that as you recall, from 1972 to 1979 the Army had a total of $24.8 billion cost growth in its systems. Yet in calendar year 1980 alone our cost growth was $20.9 billion. Last year you will notice that the cost growth was $5.9 billion and as of the end of calendar year 1982 you will see that our cost growth for the last year is $0.7 billion.

Senator **GOLDWATER**. Are those constant dollars?

General **MERRYMAN**. These are current dollars. You will notice at the bottom of the chart it restates what I just said.

Senator **KENNEDY**. Before we go on to the next chart, the relationship with the other services, I wish to note that even at the present time your procurement requests are certainly below those of the other services.

Is that correct?

General **MERRYMAN**. Yes, sir.

Senator **KENNEDY**. It would be interesting to see how it compares with past requests. I am trying to put into perspective what the flow line has been. Perhaps it would be of some value to the committee as well if you had a similar chart of the other services during a comparable period.

General **MERRYMAN**. Yes, sir. What I show now in the next three charts is what I will cover today by mission area. These are the close combat systems I will discuss.

CLOSE COMBAT

M1 Abrams tank.
Bradley fighting vehicles.
Apache attack helicopter.
Hellfire antitank missile.
Army helicopter improvement program (AHIP).
Light antitank weapon.

The next chart is fire support systems.

FIRE SUPPORT

Pershing II.
Multiple launch rocket system (MLRS).
Joint tactical missile system (JTACMS).
Copperhead.
Remotely piloted vehicle (RPV).
Joint surveillance and target attack radar system (JSTARS).
Fire support team vehicle (FISTV) modification.
Field artillery ammunition support vehicle (FAASV).

The next chart is air defense systems. The Sergeant York—it was called DIVAD last year until we renamed it.

AIR DEFENSE

Patriot air defense system.
Antitactical missile (ATM).
Sergeant York gun.
Stinger.

The next chart includes combat support and combat service support systems. I believe all of those are self-explanatory.

COMBAT SERVICE SUPPORT AND COMMAND CONTROL, AND COMMUNICATIONS (C^3)

Combat service support

Black Hawk.
Chinook (CH-47D) modernization.
High mobility multipurpose wheeled vehicle (HMMWV).
Commercial utility and cargo vehicle (CUCV).

Command, control and communications (C^3)

Single channel ground and airborne radio system (SINCGARS).
Position location reporting system (PLRS).

The first system that I will discuss is the M1 Abrams tank.

M1 ABRAMS TANK

Fiscal year 1984 RDT&E request: $86.3 million.

Fiscal year 1984 weapons system procurement request, $1788.9 million.

Army's primary offensive weapon replaces M60 series tanks in selected units: 720 in fiscal year 1984 request, 7,058 total buy; fiscal year 1984-6th year of production, 2,523 procured thru fiscal year 1983 FDP.

As I am sure you are aware, a lot has happened during the past year. As of the end of February we have accepted 916 of these tanks. By the end of the next 60 days we will have over a thousand of them in the field. I can tell you in all honesty the soldiers love this tank. Not only the soldiers, but also the commanders love them.

General Wagner is probably the greatest authority in the U.S. Army on tanks. He just came from Fort Knox. Our new Deputy Chief of Staff for Operations and Plans, the gentleman who is his boss, just returned from Europe, Lt. Gen. Fred Mahaffey. In Europe he commanded the 3d Mechanized Infantry Division. That division had the M1 and he tells me that the potential capability of the M1 is going to revolutionize the way we fight a war.

What I am talking about is its speed, its ability to fire on the move, and what that gives the commander as far as moving forces in a timely manner. We show what the dollar figures are for R&D and procurement. Each system I will discuss will be from a chart like this. The R&D will start our M1/E1, which is the 120-mm gun integration in this system.

The procurement funds will buy an additional 580 M1's and the first 140 of our 120-mm gun tanks.

Senator **GOLDWATER**. You will have run a test of this tank in Saudi Arabia?

General **WAGNER**. Yes, sir. That is basically a demonstration. We have actually tested it in rougher terrain out in Yuma as far as sand problems are concerned.

We have developed special terrain there, sir, to test them on. It will have no problem in that Saudi sand.

General **MERRYMAN**. What I will do now, sir, is show you a second chart describing highights.

M1 ABRAMS TANK HIGHLGHTS

FISCAL YEAR 1982 ACCOMPLISHMENTS

Developmental testing (DT) III completed—February 1982.
Three battalions fielded in Europe, tried in Reforger.
Detroit tank plant produced M1 on schedule.
Successful transition to General Dynamics.

Positive cost reduction trend established.
Powertrain durability test suspended—September 1982.

FISCAL YEAR 1983 STATUS/PLANS

Powertrain durability test renewal—summer 1983.
Sixty/month production rate.
M1E1 user review—January 1983.
M1E1 DT II began—January 1983.
Engine second source RFP—February 1983.

I will also show you a similar chart for all the systems. I will talk to you about what we did in 1982, what we are doing in 1983 and the final chart touches on where the dollars go for 1984.

In 1982 we finished our developmental testing for the M1. We fielded three battalions in Europe. We brought on a second tank plant. The two plants are now producing greater than 60 tanks a month between them. We had a successful transition from Chrysler to General Dynamics, and I can tell you we give General Dynamics high marks. The difference in management is remarkable. We have had a positive cost reduction trend established as I will show you in a moment when I show you the cost growth.

The only bad news of this past year is that we still do not have our powertrain durability in hand. We are close, but we still have some problems there. If you remember, the requirement was to have a 50-percent probability of going 4,000 miles without a durability failure. We made 0.48, so we are very close, but we have not quite made it yet.

We had a test last year and we only ran a few hours. We had three tanks fail because of a thing called the recuperator which is a part of the engine that recirculates the hot gases. We had some seals fail and that is where the gases leaked out. It was a quality problem.

It was our determination there was no point continuing that test until the producer whipped the quality problem. So we canceled the test and we will reschedule that test for this next summer. We plan to use engines coming out of production in May, which is our projection as to when the manufacturer will have all of the quality problems under control. The test will resume in early August.

I mentioned earlier that we have three battalions in Europe. The Detroit plant is on schedule. As I mentioned also, we are producing above 60 a month. We produced 65 last month and 67 the month before.

There are two other things of significance. One is that as you know, we are getting ready to go into production of the 120-mm gun in the tank. To make sure that we are doing the right thing, we once again had our user the Training and Doctrine Command [TRADOC] review the requirement for the 120-mm gun in the latter part of this last year.

We had our meeting in the Pentagon in January where the user and all the representatives came in to tell us if we should or if we should not go to the 120-mm gun. The answer was an overwhelming yes, we should, and in addition to the 120-mm gun, Senator, they said we had better get on with enhancing our current 105's.

This is something I think we discussed last year. It is important to enhance the 105 because even after you get the 120-mm gun, most of our tanks will still have 105's.

In addition, many of our allies will have 105's. [Deleted.]

Senator GOLDWATER. Will the 120-mm gun be a finguided weapon or be a rifle?

General MERRYMAN. It will be smooth bore. It will be like a tank projectile today without the rifling.

General WAGNER. It has been fin stabilized, sir.

Senator GOLDWATER. That is quite a gun.

General MERRYMAN. It is and the result of the XM829 round we are developing so far looks very good.

The final point I will make on the tank is that we have just released an RFP [request for proposal] for a second source engine producer. It was released in February. We expect to get the information back shortly and if it looks good, we will project going on contract later this summer.

M1 TANK MANAGEMENT

Senator BINGAMAN. General, you were saying that there is a major difference in the management now that you have switched to General Dynamics.

General MERRYMAN. Yes, sir.

Senator BINGAMAN. Could you elaborate a little bit?

General MERRYMAN. We had problems with the previous manufacturer, Chrysler, as far as quality control, to be quite frank. In my personal assessment, we continually had problems and every time we thought we had it fixed, we found out we didn't.

We said to Chrysler that you have to fix your line so that you produce a tank that comes off it that we can accept. We ran into a problem where they would get the tank at the end of the line and find numerous deficiencies.

What you have to do is fix it as you go along so that you get something at the end of the line that you can accept. They never did satisfactorily complete this effort.

GD management came in and it was almost like a breath of fresh air, in all honesty.

Senator BINGAMAN. General Dynamics is producing all the tanks at this time?

General MERRYMAN. Yes. They have two plants that produce the tank and they have one up in New York that produces some parts. GD has everything. They bought those rights from Chrysler.

General WAGNER. I followed it very closely because if the tanks came to Fort Knox and weren't any good, we wouldn't like them.

Another management change they made was to put someone centrally in charge. In the past when the PM had a problem he had to go to some individual in the department that handled that part of it.

It has been Army experience that in all businesses you have to have a top man in charge to whom you can go to to get a problem solved. That is how they handle it at General Dynamics now. When the PM has a problem, he goes to the general manager and gets that problem solved.

ABRAMS FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY84 $)

DEV EST FY72	2.11
FY83	2.58
FY84	2.63

COST GROWTH

FY83-84	2.0%
TOTAL	25.0%

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	843.5	85.1	86.3	51.8	119.9	1186.6
WPN SYS PROC	4367.4	2093.7	1788.9	1792.8	9126.8	19169.6
QUANTITY BUY	1668	855	720	720	3095	7058

$(000,000)

General MERRYMAN. This is the third type of chart that I will show you on each system.

On the left side it shows you the program unit cost in the year that we started, that is back in 1972 for the tank, the cost in 1983 and cost in 1984. Those are all in fiscal year 1984 constant dollars. The program unit cost is everything wrapped into one package. Then you divide the number of systems into that total cost. So it is the highest cost you are going to see for a system.

On the bottom, sir, I am showing you what we had put into the program in 1982 and prior, then the dollars for RDT&E and procurement, and the quantity for each year we are talking about today, 1983, 1984, and 1985 and then a "To Complete" column and a "Total" column.

On the right I show you our cost growth figures. the first number is the cost growth in fiscal year 1983-84 and the bottom shows you the total cost growth for the life of the system, in this case from 1972 to 1984.

What this tells you is that in the case of the M1 cost growth has been very much under control.

I will show you some other systems where that has not been the case, but for this system we are very proud of what we have been able to accomplish.

BRADLEY FIGHTING VEHICLES

Fiscal year 1984 RDT&E request, $9.1 million.

Fiscal year 1984 weapons system procurement request, $992.3 million. Improved battlefield mobility, firepower, survivability.

Infantry/cavalry versions.
Complements Abrams tank.
Six hundred in fiscal year 1984 request; 6,882 total buy.
Fiscal year 1984—Fifth year of production.
One thousand seven hundred procured through fiscal year 1983 FDP.

The next system I will discuss is the Bradley which comes in two configurations, an infantry fighting vehicle and a cavalry fighting vehicle. We are buying this vehicle, as you know, to complement the M1 tank and what it does is carry infantry inside. It has a TOW antiarmor missile that is mounted on top. It also has a stabilized 25-millimeter Bushmaster gun so that you have several capabilities. You can fight from the Bradley, you can use your 25-millimeter to destroy thin-skinned enemy vehicles, and you can use the infantry inside for the purposes that the infantry was meant to be used for.

This chart shows you 1984 RDT&E will continue the development of our biological and chemical defense improvements. The procurement dollars will buy 600 vehicles. The first unit that will be formed in CONUS will be formed at Fort Hood this month. It will go to Europe also at the end of the month and 3d battalion will be formed in September.

Since you and I last talked, we have built a lot of these. We have built 346. The production contract is 3 weeks behind schedule. We had a strike and the vendors also have been slow in getting some of the parts to the prime contractor. They have also been slow in getting that line organized. That is not necessarily bad news. That is sort of normal news.

The project manager believes they will have it all under control by the end of April.

BRADLEY HIGHLIGHTS

FISCAL YEAR 1982 ACCOMPLISHMENTS

Production vehicles delivered to training base.
Government production vehicle testing initiated.
Production ramped from 2 months to 40 months.

FISCAL YEAR 1983 STATUS/PLANS

Production currently 3 weeks behind.
Breakout of major subsystem contracts.
Achieve program cost stability.
Field Bradley in Conus and Europe.
Stabilize production at 50 months.
Complete Government initial production testing.
Thus far, 381 MMBF demonstrated versus 240 MMBF goal.

This chart shows you the 1982 accomplishments. We sent the first production vehicles to the training base, we are just finishing our Government production testing, and we ramped our production from 2 to 40 per month.

As far as the testing is concerned, we had a problem. We fired some TOW's and we had a couple go into the dirt and we didn't know why for a while. As it turned out, it was an easy fix. It was just a hardware problem where you had in the sight unit some threads that needed to be painted because the sensor was picking up the unpainted part where the thread was. Once we painted it we solved the problem.

We have had 24 successful firings since then and consider that to be no problem.

As I mentioned before, we are 3 weeks behind schedule in our production. Some of the things that we are doing in 1983 to save money is to break out some of our major subsystem contracts. For the last 2 years there has been no increase in cost. So we are proud to report that our costs have stabilized.

The Bradley is going to Europe and to CONUS. We will stabilize production in April of this year at 50 a month. We will also complete initial production tests.

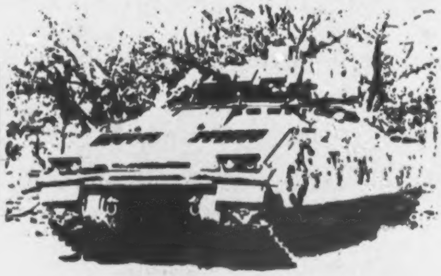
I put the last bullet on this chart because it is a good news bulletin. I am happy to report that what I have there is wrong. Not only are we above our goal of 240 mean miles between failures, that number says 381, but I am happy to report that after we have driven 24,000 miles out of 30,000 miles of tests we are now at 405 mean miles between failures.

The significance of this is, that as you will recall, when we were at this same stage with the M1 we were having all kinds of problems. We were way below our goal. In this case it is a good news story. So we are pleased with that.

BRADLEY FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY84 $)

DEV EST FY72	1.01
FY83	1.65
FY84	1.52



COST GROWTH

FY83-84	– 7.9%
TOTAL	50.5%

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	445.5	45.9	9.1	24.5	7.7	532.7
WPN SYS PROC	2166.5	1007.4	992.3	1309.5	5699.1	11174.8
QUANTITY BUY	1100	600	600	830	3752	6882

$(000,000)

This is the same chart for the Bradley as I showed you for the M1. You will observe we have a minus 8-percent cost growth for the past year. That minus 8 percent resulted from the fact that we took some proposed product improvements off. We have a No. 1 program manager, whom I have with me today, and he has done a fantastic job.

There has been, as Dr. Sculley mentioned earlier, some pretty intensive cost control.

For this next system I am pleased to introduce to you, Senator Goldwater, the new program manager of the Apache attack helicopter. General Brown retired last year as I am sure you know. I would like to introduce Gen. Chuck Drenz.

Senator **Kennedy**. You indicated that you stabilized productions in April at 50 a month.

General **Merryman**. Yes, sir, in April. We will start to ramp up, sir, to 90 a month in 1985 and we will hit that level in 1986. Then we will stay at 90 a month until we buy out.

Senator **Kennedy**. When does that buy out?

General **Merryman**. 1989. It is a little over 6,000 vehicles.

STATEMENT OF BRIG. GEN. CHARLES F. DRENZ, PROGRAM MANAGER, ADVANCE ATTACK (APACHE) HELICOPTER

General **Drenz**. Mr. Chairman, with your permission I would like to save some time and just pick out some of the key charts from my presentation and brief the committee on those particular charts.

Senator **Goldwater**. Let me ask you one question.

I know you just completed your negotiations yesterday. Did you come up with the same price you had last year?

General **Drenz**. On the second year contract?

Senator **Goldwater**. Yes.

APACHE CONTRACT NEGOTIATIONS

General **Drenz**. It is not really the same price because, as you know, they get cheaper. So if you take that into consideration, it is roughly the same price, yes, sir. We have not signed the contract yet. We have agreed on prices. We did that at 0130 Saturday morning and we had been going until 1 or 2 o'clock every morning, Friday, Saturday, and Sunday.

We put the negotiating teams back together during the week to see if they could not straighten out some of the negotiations that had taken place over the weekend, but we did agree on Saturday.

Senator **Goldwater**. Will that contract provide for 48 helicopters this year?

General **Drenz**. Yes, sir.

Senator **Goldwater**. And all the spare parts?

General **Drenz**. And all the spare parts, yes, sir. We had to do a little descoping to get agreement on price, roughly about $18 million, but we have protected the program and the program schedule in that process. Those deletions or deferments in the case of that amount of money protect it so far as the contract and program is concerned.

Senator **Goldwater**. You don't feel that your negotiations will result in any increase in cost?

General **Drenz**. No, sir. We negotiated that contract within the fiscal year 1983 budget appropriation. As a matter of fact, we have managed to maintain in the program some contingency funding since this is a fixed-price incentive-type contract. In the event that

Hughes does go over the target price, I, as program manager, do have contingency funding to take care of some of that.

Senator **Kennedy**. What is "descoping?"

General **Drenz**. Descoping in the procurement sense means when we send a request for proposal to a contractor it contains a very defined statement of work, exactly what the task is that he has to perform. In this case, it involves not only manufacturing the aircraft, but all of the spares, support equipment, training, and so forth, that goes along with that.

So the statement of work books, for example, on the Apache would probably be as high as this desk here and about 3 feet long.

When you get into the proposal stage you scrub down the statement of work so to speak. Sometimes within that statement of work some of the various tasks can be deleted or delayed when you find out through the process of dialog and communications with the contractor that you can take some of that out. Let me give you an example.

Bench-maintenance components that are used for training, rather than buying new components. We actually made a decision during the negotiation process to take some of our prototype aircraft that we won't need, take the components off those aircraft, put these in the training bases—they are representative of the production components—and use those for training purposes.

Another descope we did was that in this program, we are under contract for logistics support for the first 3 years, and the contractor provides the wholesale supply parts and spares to the field, and also provides the depot contract, depot maintenance for the aircraft system.

We found out that he had about $2 million in his proposal to lease a commercial facility in California where he was going to store the parts that he was going to issue to our troops. We decided to take that facility and put it at a Government-owned facility on Red River Army Depot.

We saved ourselves $3.2 million in that process. These are the types of things we did.

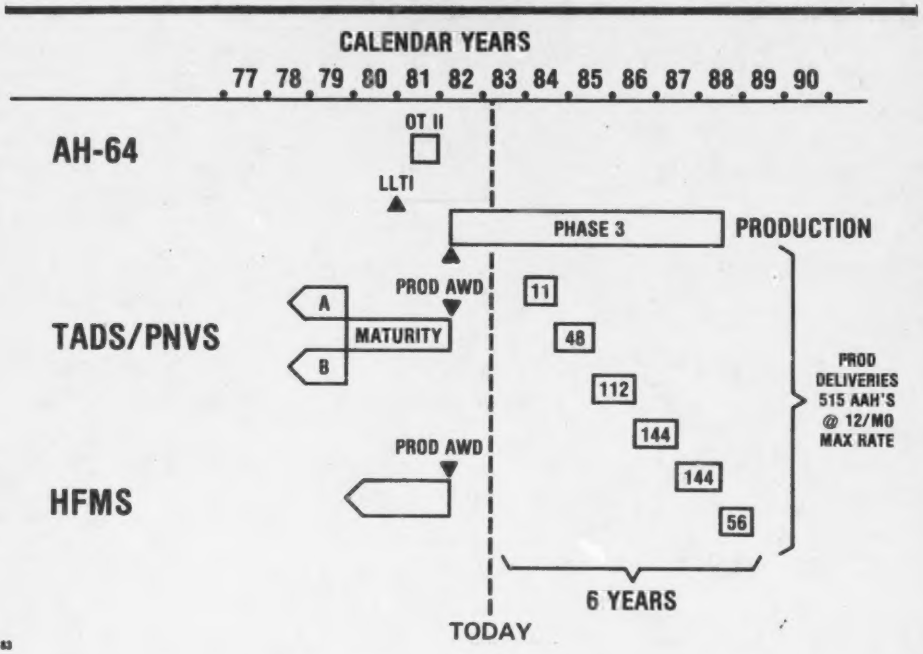
You probably remember this picture here. [Chart deleted.] This is December 16 in Mesa, Ariz. You might be standing around the reviewing stand. This is a prototype that provided the demonstration. Of course, the purpose of my briefing here is to show you that we are, in fact, in production on the Apache.

APACHE PRODUCTION

This is the main assembly building that Hughes constructed in 1982 and completed on December 16, 2 months ahead of schedule.

In phase I of this construction effort in Mesa they built a parking lot area, main assembly building, also a central facility-type building where it provides support utilities. They are now constructing phase B over in this part of the acreage out there which consists of three flight hangars, a warehouse for storing materiel, and also a paint facility. That should be completed on schedule by July of this year and, of course, will begin assembly and testing our Apache in that facility in Mesa.

AH-64 PROCUREMENT PROGRAM



Shown on this chart here is the schedule for procurement of 515 Apache helicopters. As you are aware, we signed that contract after we got our production decision in March 1982. That contract for the first year, 11 aircraft, was signed on April 15. As I stated, we agreed to a price on our fiscal year 1983 buy of 48 aircraft last Saturday. This is the schedule.

AH-64 PRODUCTION SCHEDULE

FY PROCUREMENT QTY	AIRCRAFT DELIVERY (CALENDAR YEAR)											
FY82 - 11 ACFT					1984							
	J	F	M	A	M	J	J	A	S			
	0	1	1	1	1	1	2	2	2			
FY83 - 48 ACFT	1984						1985					
	O	N	D	J	F	M	A	M	J	J		
	3	3	3	4	5	5	6	6	6	7		
FY84 - 112 ACFT	1985								1986			
	A	S	O	N	D	J	F	M	A	M	J	J
	8	8	8	8	9	9	10	10	10	10	11	11
FY85 - 144 ACFT	1986								1987			
	A	S	O	N	D	J	F	M	A	M	J	J
	12	12	12	12	12	12	12	12	12	12	12	12
FY86 - 144 ACFT	1987								1988			
	A	S	O	N	D	J	F	M	A	M	J	J
	12	12	12	12	12	12	12	12	12	12	12	12
FY87 - 56 ACFT	1988											
	A	S	O	N	D							
	12	12	12	12	8							

[illegible]

Of course, we are in here today to get funding to buy fiscal year 1984's increment of 112 aircraft. You will notice the first delivery of our first aircraft is February 1984. You will notice also that we have what we feel is an achievable low-risk ramp up to 12 a month.

We feel it is very critical to maintain this program in the status that we show it to you here, simply because it has all been planned and tailored to support this 12 month rate.

The facility, for example, at Mesa, is built to support this and, of course, all the tooling and equipment that is being procured are phased into that also.

Senator GOLDWATER. Do you think there is any risk involved in going to 12 a month? Do you think he can do it?

General DRENZ. Sir, I think so because of a number of reasons.

First of all, it is a very gradual buildup. We don't jump from 6 to 10 or 7 to 9 or whatever. It is gradual. This program was structured in the 1977–78 timeframe to give us additional production leadtime. For example, if you take into consideration the long leadtime contract that was awarded in fiscal year 1981, the time for that first aircraft is about 34 months. If you compare that with previous systems that I managed, the Black Hawk, in 1 year we had a 24-month effort there.

We have given this contractor additional production leadtime to get it all together.

Another reason is that this particular contractor has structured his program so that he is really the prime integrator or assembler of this system. He makes or manufactures very little in-house. He has spread that risk across 33 major subcontractors.

Granted they have to come through, be he did not take all that manufacturing risk on himself. So everything that goes into Mesa with the exception of tubing and wire bundles, which are fabricated there in Mesa, everything else comes from all over the United States.

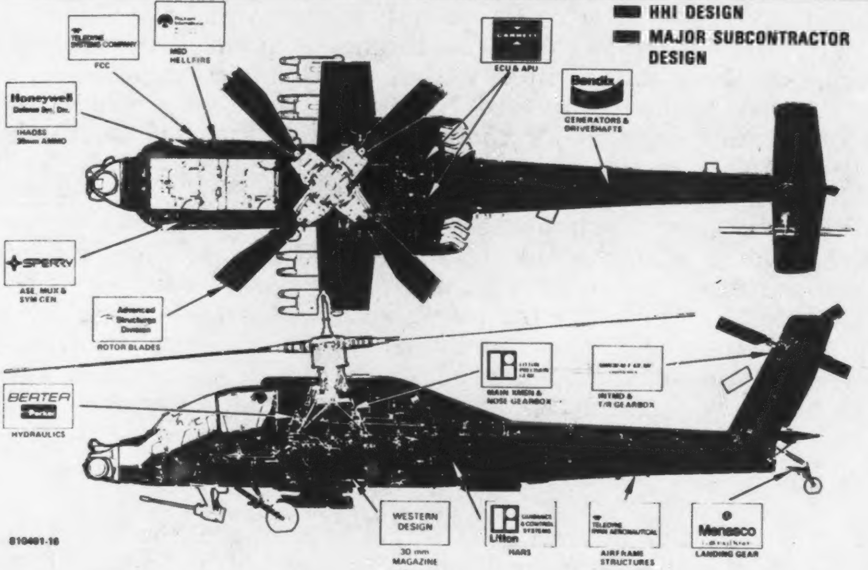
The other point I would like to make here is that this is a sophisticated system, as you are aware. I believe you have flown the system, Mr. Chairman. The way Hughes structured the assembly process at Mesa, for example, is that there is a great deal of automatic test equipment involved. So if there are any problems with major assemblies or major components, they know it before they plug it into the airframe.

That does not consider the testing and accepting that is done with all the components and assemblies at the subcontractor level. They have to pass the test there before they are delivered into Mesa. For example, on wire bundles, they are all checked as they are fabricated, and all of the black boxes in the system are put on a mockup and checked thoroughly by computer before they are installed in the aircraft. When they are put in the aircraft along with all the wiring, that again is checked several times even before it gets to end station on the line.

MESA FACILITY

By the time this aircraft gets to the 20th station, the last station on the line, it has been checked and rechecked and tested to the point that when it comes off that line is should go. That does not count the ground checks and flight checks.

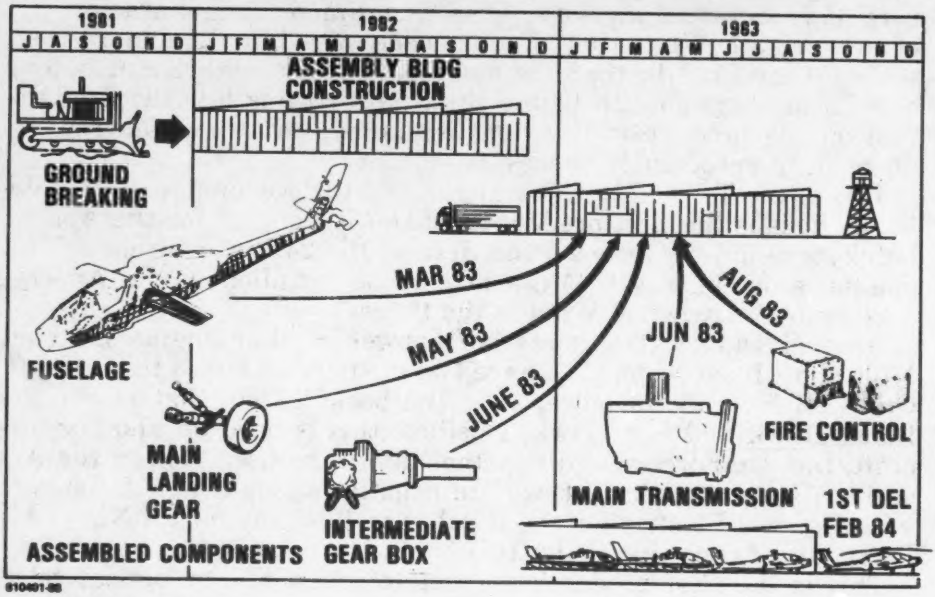
"MAJOR SUBCONTRACT MANAGEMENT/SUPPORT ON SCHEDULE"


HHI DESIGN
MAJOR SUBCONTRACTOR DESIGN
TELEDYNE SYSTEMS COMPANY
FCC
HELLFIRE
ECU & APU
Honeywell
IHADSS
30mm AMMO
Bendix
GENERATORS & DRIVESHAFTS
SPERRY
ASE, MUX & SYM GEN
Advanced Structures Division
ROTOR BLADES
BERTEA
Parker
HYDRAULICS
MAIN XMSN & NOSE GEARBOX
INTMD & T/R GEARBOX
WESTERN DESIGN
30 mm MAGAZINE
Litton
GUIDANCE & CONTROL SYSTEMS
HARS
TELEDYNE RYAN AERONAUTICAL
AIRFRAME STRUCTURES
Menasco
LANDING GEAR
810481-16

This chart is a little bit difficult to see. What it shows here is two views of the Apache. The coloring shows you what Hughes Helicopter incorporated and designed. That is the area you see in color. They designed that portion of the aircraft. The design details, of course, were put out to subcontractors, and they actually make the Hughes design. This entire fuselage is fabricated in San Diego at Teledyne Ryan. It comes to Mesa, ready to be stuffed with all the subassemblies and components on that assembly line.

When you look at this view graph here the black areas, the rotor hub, the engine suppressors, for example, portions of the cockpit are the only things that Hughes makes. The rest are all made by subcontractors. You can say the major subs are quite well known.

MESA SITE CONSTRUCTION SUPPORTS MAJOR COMPONENT ARRIVALS


1981
J A S O N D
1982
J F M A M J J A S O N D
1983
J F M A M J J A S O N D
ASSEMBLY BLDG CONSTRUCTION
GROUND BREAKING
MAR 83
MAY 83
JUNE 83
JUN 83
AUG 83
FUSELAGE
MAIN LANDING GEAR
INTERMEDIATE GEAR BOX
MAIN TRANSMISSION
FIRE CONTROL
1ST DEL FEB 84
ASSEMBLED COMPONENTS

Hughes Helicopters

This chart depicts the schedule I spoke to. It is manufacturing the first increment at the Mesa facility. This was done by Chanen Construction Co. They did an outstanding job in meeting the schedule and putting together and constructing this facility. They will construct the rest of it by July of this year.

I mentioned the airframe that will be due from San Diego in March 1983. That will start at the first station. These are representative items that will be processed at various timeframes: main transmission in June, to meet our rollout requirement of 30 September, and, of course, our first flight is scheduled for 15 December, finally delivery to the Army in February 1984 of the first aircraft.

This is just another view of the building. [Chart deleted.] It is quite a good facility, as I mentioned, optimized for efficiency to produce aircraft at 12 a month at Mesa.

This is just the interior part of the building. [Chart deleted.] This is taken shortly after Decmeber 16, 1982. They actually started moving in the facility in February 1983. They have right now in the facility all their management wire fabrication and test, and tubing fabrication and test. Many of their automatic test equipment computers and facilities for validating all the components, that I mentioned that have to be tested before they were stuffed into the aircraft, are in place.

The aircraft will come in back here, go 10 stations up this way, turn around, go 10 stations down this way, and out the door to paint and test.

This shows you one of the back shops I mentioned. [Chart deleted.] It is a planning shop, planning area. This particular mockup again reduces risk. It is what we call our system development fixture. It is an actual mockup of the true dimensional characteristics of the aircraft. When they produce their wire bundle, and all their tubing, they fit it in there to make sure it fits and that it is long enough or short enough before the first airframe hits the first station on the production line, and is another what we call, risk reducer in the production process.

This is the T-700-701 General Electric turbine engine. [Chart deleted.] This is the first production of the 701 engine for the Apache helicopter, and we recieved the first on the 24th of February. That engine is on its way to Mesa now to be installed in the Apache.

Senator GOLDWATER. What is the thrust?

General DRENZ. The shaft horsepower of that engine is about 1,700 shaft horsepower. We have two of them on board the aircraft. Quite an increase in power over the basic T-700, that power the Black Hawk and Sea Hawk. I believe this is used on another aircraft, the Air Force aircraft system. It will be used also on the Apcache. As a matter of fact, we are negotiating right now a contract with General Electric for the fiscal year 1983 buy for all Navy, Air Force, and Army aircraft for this engine on a multiyear basis.

This is the first production article of our ORT, or optical relay tube, that fits into the front cockpit of the Apache. [Chart deleted.]

The gunner operates this. It has the operations and control on there for the FLIR [forward looking infrared] system, the direct view optics and, of course, the television system for target acquisition and firing of the Hellfire missile.

This shows you a few representative subcontractors. [Chart deleted.] This is Aircraft Gear out of Chicago, Ill. They make a number of the dynamic components to include the gear box.

This is the gear box. This is the test cell it will go through to make sure it works properly before they can sign it off to the Government for shipment to Mesa.

Again, some components. [Chart deleted.] These are all the stationary masts for the first 11 aircraft. They have already been machined and they are ready for Government buyoff.

This is Menasco in Burbank, Calif., and these are the main landing gear struts of our first lot of aircraft. Some are machined, some are awaiting machining. This photo was taken about a month and a half ago. I am just trying to prove we are in production on this aircraft.

AH-64 APACHE
KEY PROGRAM COST RECAP

($ IN MILLIONS)

	DEV EST		MAR/SEP 81 SAR			DEC 81 SAR (MAR HRG: JAN 82 INDICES)			DEC 82 SAR JAN 83 INDICES		
	C72	ESC	C72	C82	ESC	C72	C83	ESC	C72	C83	ESC
TOTAL R&D	609.4	935.7	698.4	1137.4	1137.5	736.4	1224.1	1230.9	759.3	1222.8	1229.9
TOTAL PROC	1266.3	2822.4	1498.2	3744.6	4820.7	1717.3	5022.6	6149.9	1938.0	5035.2	6131.3
TOTAL PROG ACQ	1875.7	3758.1	2196.6	4882.0	5958.2	2453.7	6246.7	7380.8	2700.5	6266.0	7369.9
UNIT F/A	1.804	4.511	2.251	5.628	7.271	2.971	8.689	10.660	2.775	7.209	8.801
UNIT PROC	2.36	5.27	2.80	6.99	8.99	3.85	11.26	13.79	3.76	9.78	11.91
UNIT PROG ACQ	3.44	6.90	4.03	8.96	10.93	5.39	13.73	16.22	5.15	11.96	14.06

Sir, getting into the cost recap area, this chart depicts the history of the cost situation on the Apache helicopter since we started this program in 1972.

Over here is the original development estimate in terms of constant fiscal year 1972 dollars and those 1972 dollars at that time in 1972 as forecasted to be escalated. As you know, there was a lot more escalation than we forecasted in 1972. It is broken out by total R&D. On a unit cost basis these were the numbers that we are looking at back when we started the program.

When we went into our engineering development phase which we call phase II on this system in 1976 after the flyoff, we did a bottoms-up baseline cost estimate. We came up with these revised numbers you see in this column here. As you know, last year there was a special hearing regarding our revision or revised cost estimate based on a new estimate that is required in order to go from phase II or engineering development into production. These are the numbers that the committee saw at the March hearing last year and, of course, these were based on a buy of 446 aircraft.

As you may recall, the $6 billion in terms of escalated dollars bought the aircraft on a unit cost basis of $13.79 million, $16.22 million. We got approval on the budget in fiscal year 1983. We then negotiated our contract, as I mentioned, in April of last year with Hughes helicopter and Martin Marietta. We found we did not need the $528 million of risk money that was in the production program because we had negotiated our contracts at prices.

The Army then made the decision to take that money and use it to buy additional aircraft. This last column is the profile we are now currently operating under. Instead of buying 446; for about the same amount of money, we are buying 515 aircraft based on the price we obtained in negotiating the first year buy of 11 aircraft.

So you see we have had a decrease in unit procurement cost from \$13.79 million down to \$11.91 million. Total program cost was \$16.2 million to \$14.1 million. This is the number that we have to be concerned with simply because the rest of that number is sunk cost in the R&D area.

Sir, any questions?

Senator **Goldwater**. There will be questions, but we have two votes coming up on the Senate floor. I want to ask if it is all right with the subcommittee to allow the staff to ask questions then when the Members come back we can resume.

If the Members don't object to our staff asking questions. then when we come back we will carry on.

NEED FOR INDEPENDENT REVIEW

Senator **Kennedy**. Could I ask a general question? As a new member of the committee I have listened this morning to testimony on the various weapons systems that are being requested by several services. Seeing the efforts that the Army has made to assure us that you will have the various weapons systems necessary to carry forward plans to match a perceived threat and new concepts for an effective Army of the future, I suppose from our vantage point, what these weapon systems can do is very important and impressive. I think you have made an important case for their increased effectiveness in carrying out the mission. But the concern I have is that perhaps some of these weapon systems have developed a constituency of their own.

Wouldn't we be better off in reviewing, and trying to develop some kind of process or system where there exists a truly independent evaluation, utilizing skilled professionals, perhaps exservicemen and women from the military, that would follow these flow charts at least half the time and be availabile to the Congress and certainly to the Secretary of Defense so that he has that kind of an input as well?

The thing I am concerned about is that every one of these weapon systems that you talk about all seem to be enormously important for carrying forward your mission. You make a powerful case. All the other services do exactly the same. We are left up here trying to do the best we can evaluating them. In some instances we see significant cost overruns. Those programs might become the targets for cuts because they are more costly, but in terms of their military effectiveness they may be more important in carrying forward your mission.

We are left in that situation. Perhaps those members that develop a high degree of skill and capability on this committee and other committees can read their way through and form a balanced judgment, which obviously we will have to do.

Doesn't it make sense to have that kind of review, that kind of independence, so that even where you have input into what is necessary and essential, the Congress will have recourse to that capability in questioning these individuals. The Secretary of Defense will have it. It then might very well have a greater degree of credibility? Perhaps this method insures that you will get the weapon systems that are essential and necessary, but it gives us some capability and capacity to distinguish between the extremely essential, the very essential and the marginal.

This is just a general question. It is something I would like to pursue. I know the chairman wants to adjourn so that we may go over to the Senate and vote.

Can you give us your reactions?

General **Merryman**. I can give you my reaction. If I understand what you are asking, of what the Army, Air Force and the Navy are asking for, are really important?

Senator **Kennedy**. Yes; for the Army obviously, and for the Navy, Air Force, and Marines. I think it is probably more complicated to tie them together. But that would be an advantage as well. It would relieve you from some of the problems I suppose the Army has in buying a number of new weapon systems. You have a smaller procurement budget. It is difficult for you to come before us and request a whole new series of weapon systems.

I imagine your people are spread thin assuring you that there will not be a cost overrun. Then you come back here and battle a different kind of constituency—our committee trying to meet its responsibility to national security and national defense. We are all scrambling around. If we had that independence to say, "This system is really essential. It does have a cost overrun but it must go forward," you would be relieved to some extent from playing the advocate for some of these systems.

I expect that this would be enormously helpful to the Service. I am putting this on the table for your reaction.

General **Merryman**. What you are describing is what I would say is the job of the Department of Defense. In other words, you have the individual services and it is OSD or the Secretary of Defense's job to look and see where he thinks the fluff is and where he thinks the important things are and to tell you which ones he supports. I think he does that.

As regards a separate independent body, a former serviceman——

Senator **Kennedy**. And contractors, people who are retired from these companies.

General **Merryman**. It is not done on an institutionalized basis, but it is done in certain cases when we have something too tough and we don't know how to figure it out, then that is done.

Senator **Kennedy**. I might try to get your reaction.

General **Drenz**. We do have checks and balances within the development process to include the independent nature of the testing within the Army.

Mr. **Carl Smith**. Let us take a brief recess. The chairman will be back momentarily.

[Recess.]

Senator **Goldwater**. You may proceed.

APACHE FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY84 $)

DEV EST FY76	9.09
FY83	14.31
FY84	12.63

COST GROWTH

FY83-84	− 12.0%
TOTAL	39.0%

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	1139.1	33.6	28.3	17.1	11.8	1229.9
WPN SYS PROC	595.8	895.2	1465.6	1414.8	1759.9	6131.3
QUANTITY BUY	11	48	112	144	200	515

$(000,000)

General Drenz. Mr. Chairman, I have two charts left, sir.

Over here is the program unit cost depicted in terms of fiscal year 1984 constant dollars. You will see the decrease from 1983 to 1984 as a result of adding in the risk money. That shows decrease in percentage fashion, by 12 percent. The most important part of the chart is down here. This is the total program laid out in the budget. Of course, we are requesting this amount of dollars this year to buy 112 aircraft, a total of $28.3 million for some residual R&D that we still have remaining and, of course, 1465.6 million dollars.

Summary

Apache performance meets users need.

First and second year production is on schedule and within budget.

Requested fiscal year 1984 funding is crucial to maintain production schedule and desired procurement unit cost.

In summary, sir, the point I would like to make is that the Apache has gone through a 10-year development effort. It has met the Army's requirements, in the material need document, and as a matter of fact, has exceeded those requirements in many cases.

We are on contract for our first and second year production and work effort involved in those two contracts is on schedule at or below budget.

Finally, we need the funding in fiscal year 1984. It is crucial to maintain the schedule, to maintain the cost and we hope there will not be any delay in the effort to buy the 112 aircraft.

Senator **Goldwater**. Last week Time magazine's article on defense said that in order for the AH-64 to fire the Hellfire missile it had to hover motionless for [deleted].

Would you like to comment on that?

General **Drenz**. Absolutely not true.

I don't want to be confusing; when the aircraft pops up and autonomously designates the target and that [deleted] true, that will occur.

As a matter of fact, I have a chart here that says that [deleted]. Now, there are other options available to the crew of the Apache. He does not have to sit there for [deleted]. He can launch the missile independently.

In other words, mask behind a hill or ridge line. For example, the target can be designated with laser by a scout or an individual on the ground with a ground-held laser.

He doesn't have to expose himself at all.

He can also do something else. He can launch the missile from behind the ridge line. So long as he is [deleted] he can pop up, lase the target at the [deleted] and the missile can fly to the target.

Senator **Goldwater**. I have read that. I remember flying that same exercise up and down. Certainly it didn't take [deleted].

General **Drenz**. We don't intend to stay up there for [deleted].

Senator **Goldwater**. No; nobody in his right mind would stay up [deleted].

General **Merryman**. This is another thing to consider. That is the tactics and how we would be fighting the attack helicopter. The attack helicopter is going to be down in the trees and it is not going to be up above the trees until the scout finds the target and tells it where the target is and then the attack helicopter will rise up just high enough so that they can fire the missile.

Even if it did have to stay up there [deleted] you are assuming that somebody saw it the minute it came up and fired. That wasn't in the article. I agree with you, it is somewhat misleading.

Senator **Goldwater**. I noticed in one of your pictures the target/designation sight and pilot might vision sensor.

Does that do away with that monocle?

General **Drenz**. The integrated helmet sight system on the Apache? No sir, both the pilot and the gunner still wear the monocle, if you will, and they still view the world through that monocle.

As a matter of fact, I was out at Yuma last week and flew it for the first time on an overcast night, no moonlight, no stars. I was flabbergasted by that system. Totally flabbergasted.

Senator **Goldwater**. The only part of that helicopter that has ever caused me any concern is the complexity of that sight.

Do you think you have got it down now to where the average sergeant can take care of it and it does not take a Ph. D. out of MIT to do it?

General **Drenz**. All the analyses that we have done to date say that we are going to produce a reliable system, first of all. We get better reliability as we produce more of them. We also have an ability in system backup modes, in the event it fails and the pilot is flying on the pilot's night vision system. In other words, using the monocle, it immediately switches over to the FLIR system and he sees the same scene.

It is a fool-proof system. It has redundancy.

As far as maintainability is concerned, the whole maintenance concept on the aircraft is at the user level where the aircraft are based in the attack unit. It is only removed and replaced. All of these black boxes, if they do fail, can be removed and replaced with another one in a matter of minutes.

That box will go back to what we call our automatic test station where we have automatic test equipment to diagnose where the failure is. It is repaired there at the printed circuit board level and we return it to the shelf.

Senator Goldwater. Any other questions?

Senator Levin. How many of those 33 subcontracts were competed?

General Drenz. Sir, I am not sure. I would like to have that entered for the record. Let me generally state how the competition in this program evolved.

As you know, there was a competition for the system itself between the two prime helicopter manufacturers, Bell and Hughes. Hughes, for example, has an approved procurement system. By that I mean the Government went in and said that this system is approved based on the fact it meets all the requirements in defense acquisition regulations [DAR].

One of the requirements is that competition is maximized. I would think that most of the sub contractors had to compete. I know some of them did, but I am not sure at this point how many. I will provide that.

[The information follows:]

Hughes Helicopter's, Inc.

The current count of major subcontracts for Hughes Helicopters, Inc., is 32 and for Martin Marietta is 3 or a total of 35. All except one of the subcontractors were competed as follows:

Competitive R&D	18
Competitive production	16
Noncompetitive	[1] 1
Total	35

[1] IHADSS.

For those that competed in R&D phase, follow-on competition will be as follows:

Compete P-3 (fiscal year 1984)	2
Compete P-4 (fiscal year 1985)	7
Pending Army breakout	1
Config. changing	4
Non-competitive	4
Total	18

Senator Levin. If you will tell us which subcontracts were and which subcontracts weren't.

Dr. Sculley, if you could also let us know for the record whether or not the Army recently has done some cost savings analyses on savings that are achieved by competition at the subcontractor level. Would you supply copies of them for us.

Dr. Sculley. I will be happy to supply that, Senator Levin. I can assure you that part of my major initiative to insure cost discipline is to closely examine the subcontractor-vendor supply chain.

Senator Levin. Have those studies been made recently?

Dr. **Sculley**. I have looked at some systems already, sir, but to categorize a few looks as a study would be misleading.

Senator **Levin**. For the record, please let us know where you have reviewed the cost savings from competition at the subcontractor level and what those reviews and findings have been.

[The information follows:]

HUGHES SUBCONTRACTOR COMPETITION—SUBCONTRACTOR COST SAVINGS

Cost savings from competition at the subcontractor level were reviewed during staff visits to the Apache and Patroit program offices. It is generally accepted that competition produces cost savings and a recent study was conducted to determine the feasibility of increasing the extent of competition in defense subcontracting. The study concluded that a substantial portion of defense dollars are redistributed competitively under prime contracts which are themselves noncompetitive. It further showed that the extent of subcontract competition is dependent on many opportunities and constraints that can vary widely from one system or contract to another. A copy of this study entitled Subcontract Competition (APPO 82-11), dated November 1982, is provided for the record.

[Study entitled "Subcontract Competition," retained in committee files.]

Senator **Levin**. I have a number of other questions, Mr. Chairman, but I will submit them for the record because they don't relate to the helicopter.

Senator **Goldwater**. We are going to have another session. We cannot finish today.

Senator **Levin**. I don't want to interrupt the witness.

Senator **Goldwater**. I believe the witness has completed his testimony on this subject.

Senator **Levin**. I have a question on DIVAD.

General **Merryman**. We are ready to take that up.

Senator **Levin**. Are they through with the Patriot?

General **Merryman**. No, sir, that is yet to come. With your permission, if I could, I would like to talk Hellfire for a few minutes.

Senator **Levin**. With the Chairman's permission, I will submit these for the record. I can't get back to ask the questions.

Senator **Goldwater**. We will have another meeting because we won't finish today.

General **Merryman**. I want to talk about Hellfire.

Hellfire Anti-tank Missile

Fiscal year 1984 RDT&E request, $0.5 millions.

Fiscal year 1984 weapons system procurement request, $240.7 million: Long-range anti-armor weapon; Laser-guided, direct/indirect fire modes; Main armament of Apache; 5,351 in fiscal year 1984 request, 42,332 total buy; Fiscal year 1984—3rd year of production; and 4,651 procured through fiscal year 1983 FDP.

This is the primary armament of the AH-64. This is the missile that General Drenz just referred to that has a range of [deleted]. It will [deleted]. It can fire single round or ripple fire. It has tremendous versatility. The RDT&E will complete development of the launcher test program and procurement will buy 5,351 missiles.

Hellfire Fiscal Year 1984 Budget Request

RDT&E provides test program sets.

Procurement provides 5,351 Hellfire missiles.

In 1982 we began production. In 1983 we have signed contracts with Martin Marietta and Rockwell. We will conduct some environmental storage testing and we are looking into a minimum smoke motor.

HELLFIRE FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY84 $)

DEV EST FY75	42.3
FY83	58.5
FY84	49.5

COST GROWTH

FY83-84	– 15.3%
TOTAL	17.0%

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	298.4	16.3	.5	.5	13.4	329.1
WPN SYS PROC	145.4	247.4	240.7	238.0	1006.5	1878.0
QUANTITY BUY	680	3971	5351	6026	26304	42332

$(000,000)

This chart shows you that the cost growth in this program, sir, has gone down 15 percent during the past year. Overall it is 17 percent. It is down 15 percent this year and the way we did that is due to an increase in missile quantity from 35,000 to 42,000. So, it is a combination of good management and it is a matter of buying more and therefore the cost of each unit is less.

The overall increase of the program cost is due to two major factors: Changes in the design of the system, that is, when it went from 5 inches, you will remember, to 7 inches, and reshaping of the warhead trajectory.

SERGEANT YORK GUN

Fiscal year 1984 RDT&E request, none.

Fiscal year 1984 weapons system procurement request, $671.1 million: Mobile survivable air defense for combat elements; Improves target acquisition, tracking effect range, reaction time; 130 in fiscal year request, 618 total buy; Fiscal year 1984—3rd year of production; and 146 systems procured thru fiscal year 1983 FDP.

This is our Sergeant York gun which used to be called DIVAD. The Sergeant York is necessary because currently in our divisions all we have as far as an air defense gun system is the weapon called the Vulcan. The Vulcan has very limited range, [deleted] Sergeant York has [deleted]. It has radar on it that will pick up a helicopter, and turn the turret immediately in the direction of the target so that you have a chance to kill something.

The significance of this, sir, is the fact that if you are fighting a war and you are down there in a tracked vehicle or even in a truck, you can't tell what is going on out there and especially up there. You may think you hear a helicopter coming from over here, but in all probability it is coming over from there. By the time you see it, you rarely have an opportunity to get your gun on it before it is gone.

With this system operating the way it does the gun is on it within a few seconds and you are able to kill it.

Senator GOLDWATER. What is the caliber of that gun?

General MERRYMAN. 40 millimeter.

Senator GOLDWATER. Two guns?

General MERRYMAN. It is a twin barrel system. We will field it in our heavy divisions, armored cavalry divisions and also use it in our air base air defense battalions.

Senator GOLDWATER. What is the rate of fire?

General ADSIT. 600 rounds a minute, sir.

General MERRYMAN. We are going to buy 618 of these. As I mentioned earlier, the reason we need them is because of the increasing Warsaw Pact threat posed by standoff helicopters and close air support fighters. You remember last year I told you the Soviets had [deleted]. They were building [deleted]. They are continuing at [deleted]. They now have [deleted].

I also told you about the HIP attack helicopter last year. They are building [deleted], and they are at [deleted]. So the threat continues which says we need this system worse than we ever needed it before.

SERGEANT YORK HIGHLIGHTS

Fiscal year 1982 accomplishments: production facilities completed; prototype tests conducted; system performance verified; reliability test disappointing; and RDT & E funding shortfall.

Fiscal year 1983 status/plans: 1st production delivery—September 1983; testing of early production gun feed system and turret; and extensive qualification testing of system components.

The production facilities for Sergeant York have been completed. We have conducted extensive tests of the prototype system at Aberdeen. This is sort of good news and bad news because we had some problems on these tests at Aberdeen.

We had two prototypes that we used for the testings. They were broken down hulks that had been used for a large number of hours, far too many hours for us to put in a test and expect them to react properly. We ran into problems with the gun-feed system, with hydraulic system failures, and had power unit failures at cold temperatures.

The program manager believes we have fixes for all of these and we are now ready to test these this summer to see if in fact we do have all the problems whipped. We have a fixed-price incentive contract for this system that we discussed last year that requires the contractor to deliver a system that meets the reliability goals or he has to fix it and pay for it.

What I am saying is that if we don't have the fixes by the testing this summer, if he delivers something that we cannot accept, he has to fix it.

SGT YORK FINANCIAL SUMMARY

PROGRAM UNIT COST*
(CONSTANT FY84 $)

DEV EST FY78	5.98
FY83	6.30
FY84	6.10

COST GROWTH

FY83-84	– 3.2%
TOTAL	2.0%

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	223.7	10.9	0	0	0	234.6
WPN SYS PROC	508.9	618.3	671.1	630.7	784.8	3213.8
QUANTITY BUY	60	96	130	132	210	618

$(000,000)

This chart shows you that for the past year we have had a minus 3 percent cost growth and for the total system, for the total development period from 1978, 1.9 percent cost growth. At this time, sir, I would like for the PM to describe to you one problem we have with this system as regards cost growth in previous years. This problem results from the fact that we had a fixed-price incentive contract.

We had a target and we had a ceiling, we funded the target and the contractor is under the ceiling.

STATEMENT OF BRIG. GEN. CHARLES ADSIT, PROGRAM MANAGER, SERGEANT YORK

General ADSIT. I have been PM for the last 3½ years. I would like to put something in perspective. We started this program in 1978. We are going to produce the first system in September of this year. We have gone from development to production in 5 years. We stayed on track as far as the milestones are concerned. There has been literally no cost growth in this program since 1978.

What I want to describe to you now is the fact that we did under competition gain a fixed-price incentive type contract. When we structured the 1981–82 budgets to go along with those contracts we only budgeted to target of those contracts at that time. When we got into the program we found out in fact in those years the contractor was going to the ceiling of the contract. That left us with a funding shortfall in the 1982 program of $33 million RDT&E.

The Army has found sources for that and does have a reprogramming action up here at the current time. That is RDT&E.

In addition to that, in the 1982 program the contract as far as the production is also going to the ceiling of the contract. We have found sources within our own program to be able to pay up to the ceiling of the contract. What we will require, sir, is Congress permission to reprogram from our advanced procurement line to our weapons line.

In dollar figures what we need within our own program need is a reprograming of 37.8 in 1983 and 15.7 in 1984. In addition to that, the Army will have below threshold programing also in 1982. I must point out at this point that the total amount that we are asking in addition is really only about 30 percent of the cuts this program has received since the 1983 budget was submitted.

What I am saying is that in the 1982–84 timeframe the program has been reduced by about $140 million. What we are asking back is about $40 million over and above the program.

So the recap of the money we need back of what cuts we have received in the last 9 months is $33 million reprograming action, RDT&E, 1982, and permission to reprogram within our own program for the procurement fund for 1982–84.

Senator GOLDWATER. The Chief of Staff of the Army has said the weapon is "on the margin" in terms of its utility on the battlefield and survivability.

Could you expound on that?

General MERRYMAN. What the Chief had in mind, Senator Goldwater, was trying to explain that we are bringing on a lot of new systems. We have had several reviews to look at which are the most important and which are the least important. We have tried to prioritize which systems we have to stick with regardless of the TOA, total obligational authority, and which systems would have to go if the TOA were cut significantly.

The Chief's comment did not in any way reflect his concern about the capability of the system. We desperately need this system. You can imagine why, with the Vulcan that will only go [deleted] and Sergeant York which will provide us with a kill [deleted] and also has a radar which really gives you a realistic chance to kill something.

We want the system badly. But if you ask is it on the same priority as the M1 tank, then the Chief will tell you no.

PIVAD

Senator GOLDWATER. WHAT IS PIVAD?

General MERRYMAN. It is when we take the current Vulcan gun and improve its capability. Right now the Vulcan is tough to use. The sight is not the best sight. So, your probability of hit is very low. It moves erratically. We are going to improve that. The maintenance of it is a nightmare. We are going to improve the maintenance. What that PIVADs means is product improved Vulcan air defense system.

Senator GOLDWATER. How does it compare to DIVAD in cost?

General MERRYMAN. It is much cheaper, sir. Here again you are talking about reduced capabilities. You only shoot [deleted]. The biggest cost on the DIVAD is not so much the gun, which is what you compare with the PIVADs, but the radar and fire control which gives you a realistic chance to hit a target. It will make an aviator think twice before he flies close to it. If you have ever seen a Vulcan fire, it really does not worry you too much. You would not fly in front of it, but it would not worry you too much.

General **Adsit**. I don't have the original cost of the DIVAD here.

Senator **Goldwater**. How would these two weapon systems we are discussing stand up against the HIND?

General **Adsit**. The PIVAD would stand up against it with great difficulty. You are talking about a HIND that has a missile that will fire [deleted]. Even the DIVAD will only fire [deleted].

You might say that won't stand up against the HIND. Fortunately, the world is not totally flat and it is not always clear. So when you get down to the realistic ranges where you probably will have to encounter one or another, all of our studies before we initiated the DIVAD showed it to be effective against the HIND.

PIVAD is a worry. Vulcan is the reason why we initiated the DIVAD requirement. You need DIVAD for two things, or Sergeant York, because you need armor protection so that gun can go up to where our forward forces are and live under artillery attack and you need it because it provides our forces with the first realistically or realistic capability for getting fixed-wing aircraft and attack helicopters in the forward defense area. That is, that is to the radar I have referred to, the fire control and the two guns which are excellent guns. We don't have that capability today.

General **Wagner**. Looking at the tank and fighting vehicles particularly, the key to it is that it can be deployed with those front line armor and infantry units. It is not going to be a one on one battle at maximum range. The DIVADs will be on the flanks and that battlefield is not a straight line. There will be many chances to shoot at the flanks of those HINDS.

If you put them one on one at that range, you have a problem.

Senator **Wilson**. You may have covered this, General, but how is it deployed? You say on the flank? Is there a ratio? How many Sergeant Yorks do you deploy with a tank company?

General **Adsit**. Thirty-six for a division. For a division area we have 36 gun systems. That is normally broken down 12 per brigade.

General **Wagner**. This is not a weapon you keep in reserve. If a unit is in counterattack, it could pick up some as it went through your area. This is like artillery, never held in reserve.

General **Merryman**. Behind it you would have Stinger missiles and Chapparal missiles with [deleted] range. Chapparal will soon have [deleted] if we can get the money. Behind that you have your Hawk which can shoot [deleted]. Everything is echeloned.

Senator **Wilson**. How vulnerable is the Sergeant York to infantry?

General **Merryman**. Not very. It is mounted on an old M48 tank chasis so the bottom is just solid, tough steel. The top part of it has a requirement to be invulnerable to 14.5mm fire or a little better than a 50 caliber.

Infantry in all probability would not have much more than that. If they came up with an antitank gun or rocket, something like that, they could take it out, but they would have to get through a lot of our stuff to get into that position.

Senator WILSON. This is an overall question, Mr. Chairman, relating to the entire briefing.

If you were to prioritize your procurement requirements, what is No. 1? The M1?

SYSTEM PRIORITIES

General MERRYMAN. Yes, sir.

Senator WILSON. What is second?

General MERRYMAN. The M1 is in production. If you ask me about what is not in production that would be number one you are talking about the Apache helicopter. If you ask what about both of those two, they are so close, I would say the tank and then your Apache. Those two are easy. You are getting at a question that we wrestle with every day of our lives.

There are some things that just stand out, that you know you have to have. It is when you start getting down below those first few where it becomes tough because what you run into is that if you only buy those things that are obvious, you soon find you can't fight because you don't have some of the things that are less obvious like communications, like trucks, you know, the things you just sort of take for granted.

One of our problems over the years is that we have not bought enough of those things. Like Dr. Sculley mentioned earlier, our radios are 20 years old. This year we will be asking for money to get a decent radio. We are going to ask you for money for a radio that has a frequency hopping capability, that will be antijam. Just think of that.

Right now the Soviets can jam every radio we have anytime they want to. The new radio we are going to buy has a significant degree of resistance and our intelligence tells us that they should not be able to jam it for some time.

So that is a real breakthrough. Here again when you say priority, you look down there, and I bet you a year ago if you had looked at the priority of that radio versus, say, the tank or something else, it was way down there.

So, we really have to be careful because we can't just say we will buy the top six and none of the others, through priorities say 1983 to 1989 because other pieces of equipment you have to have to make the top six work.

Senator WILSON. In your R&D effort I assume that you are faced with frustrating possibility of developing a weapon that is not responsive to existing weaponry on the other side. I assume you spend some time trying to pick what the Soviets are developing to counter that possibility.

Do you ever find yourself in a situation where we don't have a counter for a Soviet weapon because we have assumed greater sophistication on their part.

General MERRYMAN. Yes. That is changing somewhat, that is to you all. I would have to say in all honesty I have been a soldier for 31 years and in this business for the last 15 off and on in Operation and R&D.

The threat has been consistently underestimated. We project what they are going to have in 1985. Too often you will find in 1985 he had it in 1980. Things like that scare you. However, I think the threat estimation is getting better because I think more people are listenting.

For example, we have just recently learned that the T-80 tank which we thought they would bring in sometime a few years downstream is already out there and [deleted]. I have the numbers here. It is there already. We just recently found that out.

Before the T-72 came out we didn't have any projection showing that it would arrive when it did. There are several examples of things that have appeared on the battlefield that we didn't expect to arrive there for several years downstream.

What we try to do, to get to your question, is figure out how do we tackle that. Before the Army buys off on any new system we have what we call an ASARC, Army system acquisition review council where all the Army leadership sits around the table and is brought up to speed on what the Soviets have today and what they are going to have 10 years from now.

One of the criteria is deciding whether to vote for going into production of a weapon is whether that weapon system will be able to counter the future threat, not today's threat, but the one that will exist when our system finally comes out of the factory.

Senator **Wilson**. Thank you.

Senator **Goldwater**. Senator Stennis, do you have any questions?

Senator **Stennis**. Thank you. I don't have anything. I was interested in the Soviet matter. I am glad to be here.

Senator **Goldwater**. You are always welcome.

I think we will adjourn and come back Thursday, if agreeable with you gentlemen. You have about an hour and a half of testimony left?

General **Merryman**. Yes, sir.

Senator **Goldwater**. We will submit questions that you can prepare answers for in the meantime.

[Questions with answers supplied follow March 10 hearing.]

We will adjourn until Thursday at a time the staff will decide. Thank you very much, gentlemen.

[Comprehensive R&D statement for the record follows:]

DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 20310

February 15, 1983

Members of Congress:

The Army has an urgent requirement to improve its near-term readiness and to modernize the force. In the next few years we will accomplish this by buying equipment currently being produced, product-improving such equipment, and by developing and procuring new equipment when needed to counter a changing threat. Our objective is to equip our Army so that it is capable of handling any task the nation assigns it.

This prepared statement explains how we are improving our readiness through modernization, and why we must do so without delay. The introduction, which requires about ten minutes to read, provides an overview of the threat we face, our research, development and acquisition objectives, and our personal views on many contemporary issues attendant to the materiel acquisition process.

Following the introduction are several sections that group our hardware systems according to their roles on the battlefield. We call these groups "mission areas". The importance of the mission areas cannot be overstated because our requirements for developing new or improving existing systems originate from analysis, designed to reveal the strengths and weaknesses, of these mission areas. We hope that our discussion of each mission area will make the Army's request for each system more meaningful by describing how those systems will make our Army more effective on the battlefield.

In addition to this statement, we are also making available to you the "1983 Army Weapon Systems" handbook, a consolidated reference for a number of our weapon systems.

We are honored to represent our Army and look forward to working with you in this session of the 98th Congress.

JRSculley
J. R. SCULLEY
Assistant Secretary of the Army
(Research, Development and Acquisition)

James H Merryman
JAMES H. MERRYMAN
Lieutenant General, GS
Deputy Chief of Staff for Research,
Development, and Acquisition

INTRODUCTION

It is a privilege to appear before this committee once again to explain how our Army proposes to arm and equip itself. We look forward to working with you again to meet our common goal--that of providing a first-rate Army, an Army that can fight anywhere and win.

While our focus is necessarily on our defense needs, we understand and appreciate that Congress must fund for many other programs which are also vital to the well-being of our country and its citizens. The Army is determined to assist you in this responsibility by doing the best we can to manage the resources you make available to us effectively, while equipping and modernizing a first-rate Army of which all Americans can be proud.

In last year's opening statement we referred to the budget increases represented by the FY81 supplemental and FY82 amendment. We described those increments as important first steps toward resolving significant deficiencies in both the quantity and quality of our arms and equipment. The FY83 budget reinforced that trend with funding increases that enabled us to improve the production efficiency of our most critical items. This favorable trend must be continued if we are to keep our forward momentum and insure that the gap that exists between Soviet forces and ourselves does not widen. Today we are presenting you with a combined procurement and RDTE request of approximately $23.9 billion for FY84. We will use these dollars to continue to improve the Army's near-term readiness posture, to modernize the total force, and to support research and development.

Near-term readiness is a must. General Meyer has described the Army's basic requirement for the 1980's as preparing for the "Three Days of War": to deter the day before war, to fight the day of war, and to terminate conflict in such a way that on the day after war the United States and its allies enjoy an acceptable level of security. Without near-term readiness, this challenge would go unmet. We do not know when or where our nation might be confronted or challenged by an enemy. We do know that our Army must be prepared to defend the nation and our national interests whenever and wherever they are threatened.

Readiness depends in large measure on seeing that our soldiers have the arms and equipment they need. We have made progress in meeting our requirements; however, today our Army is still short a large amount of the materiel which is needed to bring units up to full strength and to fill war reserve stocks. There remain units today--Active, National Guard, and Army Reserve--which simply do not have all the arms and equipment that they should. Reduction of these materiel shortages in the force must take the highest priority. To accomplish this, we must continue to procure additional quantities of equipment--currently fielded, product-improved, and new--for both the Active and Reserve Components as quickly as possible.

The requirement to equip our Army takes on increased importance when one considers the quantitative advantage enjoyed by the Soviets in both arms and equipment. They have produced and continue to produce large quantities of equipment at enormous cost to their economy. Today the Soviets outinvest and outproduce us by about a two-to-one margin in most categories of military equipment. Despite the progress we have made in equipping the force, the quantitative imbalance will remain.

While the Soviet numerical advantage increases the importance of equipping our Army, it also illustrates the need to modernize. Our Army can expect to find itself outnumbered by a Soviet adversary. Our success in overcoming the strength of numbers will depend in large measure on the quality of our equipment. However, the additional threat posed by the ever-increasing quality of Soviet weapons dictates a need to accelerate our modernization effort lest we continue to be faced with simultaneous deficiencies in both the quantitative and qualitative aspects of our materiel. To put that modernization requirement in proper perspective, it is necessary to recall what has happened in the past.

During the late 1960's and early 1970's, the conflict in Southeast Asia diverted the nation's attention and resources. The Soviet Union exploited this opportunity to mount the most massive modernization effort any nation has ever undertaken in peacetime. During the decade of the 1970's, total Soviet expenditures for procurement exceeded our outlays by approximately 75 percent, and their research and development expenditures were approximately 50 percent higher. The result was predictable. The combination of high procurement rates and sustained investment in R&D has closed and, in many cases, eliminated the quality advantage on which we have depended.

The Soviets have often fielded two, and sometimes three, generations of equipment while we fielded one. As a result, much of what they have in the field today is newer than deployed US equipment and embodies current technology. For example, the T62 Soviet and M60 series US tanks were fielded in the same approximate timeframe. Since then, the Soviets have fielded two entirely new tanks, the T-64 and the T-72, as well as product-improved variations of each. We also have seen evidence of a probable prototype of what the intelligence community refers to as the Next Soviet Tank. During this same timeframe, we have modified the M60 twice and have only recently begun to produce and field the M1.

Another example of a system that is qualitatively inferior to its Soviet counterpart is the M113 armored personnel carrier. The M113 was first built in 1962 and is a transportation system rather than a fighting vehicle. Its only armament is an unstabilized machine gun. The Soviet BMP, with which the M113 is often compared, is actually an armored fighting vehicle and has far better battlefield mobility than the M113. It is armed with a 73mm gun and an antitank missile, and is capable of operations in a chemical environment. In addition, an improved version of this fighting vehicle with a 30mm gun, the BMP-2, has been seen and reportedly has been widely used in Afghanistan.

The tank and fighting vehicle were but two examples of a growing list of systems where the Soviets had moved ahead of us in quality in addition to quantity. Considering the technological capability of this great nation, we find it totally unacceptable for us to allow the Soviets to field better equipment. Fortunately, the means to correct this qualitative imbalance are available.

The Army's research and development efforts of the past decade have come to maturity. We have pursued a program that will enable us to regain the qualitative edge, and we believe we have accomplished that objective. Today we have systems such as the M1 Abrams tank, the Black Hawk helicopter, and the Stinger air defense missile in production and in the field. Other systems such as the Multiple Launch Rocket System (MLRS), the Bradley Fighting Vehicles (BFV), the SGT York air defense gun, and the Apache Attack Helicopter (AAH) have either entered or are headed for full production.

It is important to note that our modernization effort also applies to the Reserve Component. National Guard and Army Reserve units are receiving and will continue to receive new and improved systems that cover the full spectrum of our mission needs--the M1 Tank and Bradley Fighting Vehicles for ground forces, the Roland and Stinger air defense systems, new attack and utility helicopters, and many other items.

We are proud of the systems that have been developed during the 1970's; however, it would be incorrect if we led you to believe that the Army's materiel acquisition philosophy dictates a new development program for every change in the threat. On the contrary, we recognize that we live in a world of constrained resources and must take maximum advantage of the investment we have made in fielded systems. To do this we have used, and will continue to use, product improvement programs that are designed to build on those systems that are already in the inventory.

The M60 series tank--a product of the late 1950's technology--is one example of evolutionary development through product improvement. Improvements that have been made to the basic M60 tank include engine changes that have upgraded reliability and maintainability, a stabilization system for shoot-on-the-move capability, and passive infrared sights to improve night vision. The latest version, the M60A3, incorporates a laser rangefinder, thermal sights which penetrate darkness and obscurants, and a ballistic computer which automatically lays the gun for the correct range and lead angle. The result is a 20-year-old tank that continues to be a formidable weapon on today's battlefield.

The CH-47 Chinook medium-lift helicopter, which was fielded in 1962, is another example of our product improvement program. The modernization program currently underway will extend the useful life of the CH-47 fleet beyond the year 2000. The Chaparral and Hawk air defense systems, the TOW antiarmor missile, and the Cobra attack helicopter are but a few of many other systems that have had their operational capabilities upgraded and lifetimes extended by product improvement.

It is important to note that systems improvements have the potential to benefit not only our own Army but those of allied and friendly nations as well. The Army has embarked on an effort designed to improve the combat capabilities of older US-origin equipment and munitions in the inventories of our Active and Reserve components, our Allies, and other friendly nations. This is to be done in conjunction with the Army's present modernization program.

The focus of this initiative is the antiarmor, air defense, and command, control, and communications and intelligence (C^3I) areas, and those systems which can be upgraded using either current modifications, or through emerging, innovative technologies which promise near-term results. The upgrade modifications which result will have application to our own equipment inventory and will also be available for Foreign Military Sales purchases. Countries with industrial capabilities may also consider some form of co-production. The Product Improved Vulcan Air Defense System (PIVADS) is an example of this approach. The PIVADS modifications will provide our light forces with a near-term improvement in their short range air defense capability, add significantly to reserve component air defense capabilities as the SGT York replaces Vulcan in active divisions, and be available for purchase to Allies and friends.

It must be recognized, however, that the improvement potential of any given system is limited, and that both technology and the threat continue to change. For example, some of our current air defense systems were simply not designed to function in the sophisticated electronic countermeasures environment which the Soviets are presently capable of establishing. They are also incapable of multiple target track/multiple engagement operations. The technology that makes that capability possible did not exist 20 years ago, and it is impractical to attempt to build it into an obsolete system. Therefore, we had to develop new, more capable weapons. In large measure, Patriot, the SGT York air defense gun, and Stinger, the products of the decade of successful research and development we referred to earlier, are ready to fill the gaps where older systems are inadequate, and where the potential for improvement has been exhausted.

Although we strongly believe that we should use our nation's technological strengths to counter the Soviet Union's quantitative advantage, you should be aware that our acquisition philosophy also considers the impact of "complexity" and "sophistication." Some contend that our new systems are too complex and sophisticated. Unfortunately, these terms are often mistakenly used synonomously. "Complex" by our dictionary translates to complicated and what is complicated in terms of operation or maintenance is to be avoided. Sophisticated equipment, on the other hand, takes advantage of the best features of advanced technology. Such sophisticated equipment can be made easy to operate and maintain. For example, the checkout counter at your local supermarket is sophisticated. It depends on the complexities of laser scanners, holography--three-dimensional imaging--and microcomputers. However, the operation is fast, simple, and accurate, and repairs are normally based on a simple modular replacement concept. We try to apply the same logic in developing our military systems that range from a relatively simple laser rangefinder to the automatic search and track radar of the SGT York air defense gun. Our objective is to use the best features of technology to obtain greater simplicity for the operator and maintainer. We understand that the country cannot afford an Army of PhD's to operate its sophisticated equipment; the average American soldier must be able to operate and maintain it.

We also use technology to bring about a synergistic effect on the battlefield. This is because we have found the capability of our weapons used in combination is greater than the sum of their individual capabilities. For example, our fire direction system, TACFIRE, gives us an automatic data processing system that enables our artillery to be highly responsive to fire missions. The Firefinder counterbattery radar system can locate enemy artillery positions by backplotting the trajectories of projectiles while they are still in flight. In combination, TACFIRE and Firefinder can provide the enemy's location to our guns before the first incoming round hits. Thus, our artillery can bring fire to bear on the enemy before he can adjust fires or "shoot and scoot." Individually, both TACFIRE and Firefinder perform important functions in fire control and target acquisition. When used together to engage highly mobile enemy artillery, the results are devastating. On the battlefield, systems such as these complement one another and make it possible for a small, quality Army to defeat superior numbers.

It is true that sophistication increases the cost of our equipment. Therefore, we must insure that we do not ask for more than we require or pursue technology that is unnecessarily complex. On the other hand, we must use sophistication when it makes sense to achieve the necessary effectiveness and survivability in battle. For example, night vision and thermal imaging devices are expensive, and systems such as the M1 tank, the Bradley Fighting Vehicles, and the Apache Attack Helicopter would cost less without them. To eliminate them, however, would deprive our soldiers of a necessary capability that gives them an edge on the battlefield.

Earlier in our testimony we expressed our appreciation for the support which the Congress has provided and stated our intention to manage the resources you provide more efficiently. Efficient management is especially important today. When the nation is reducing the amount of money which is going into other Federal programs, it is only right that the defense program receive continued scrutiny. It is clearly our responsibility to insure that we are spending the taxpayers' dollars as carefully as we can, and to see that the Army gets the best return on each dollar it invests in weapons and equipment.

In this regard, the Army has been seeking to improve the materiel acquisition process in order to control costs and to shorten the time between the development of a requirement and the actual fielding of the hardware to satisfy that need. Last year, the Army leadership, from the Secretary on down, took a long, hard look at the area of cost discipline. The results of this major undertaking indicated that to control costs and shorten the acquisition process, we must have:

- More stability in our programs
- Better management information
- Better and more frequent estimates
- A better transition from development to production
- Preplanned Product Improvement (P^3I)

We would like to tell you what we have done in each of these areas.

Program stability is a key element in controlling cost growth. The steps we are taking are intended to dampen the variations that programs have experienced in requirements and funding, and to create a more stable, predictable environment for both Army management and industry. Among the most promising initiatives are the following:

o The Stable Program List. Last year the Army identified four key systems--the Abrams tank, the Bradley Fighting Vehicles, and the Black Hawk and CH-47D Chinook helicopters--for stable program funding. Our objective was to establish and maintain a minimum production floor for these systems. In FY84 we have added the Multiple Launch Rocket System (MLRS) and the Apache Attack Helicopter (AAH) to the list of programs stabilized within the Army.

o Multiyear Contracting. Multiyear procurement is an acquisition tool which can lead to reduced costs, prevent program stretchouts, and ensure the early fielding of new systems. The Army has long recognized the potential benefits of this tool and has used the multiyear approach in the past for components and nonmajor systems. Your actions in expanding the authority for multiyear contracting enabled us to award a multiyear contract for a major system for the first time--the Black Hawk helicopter airframe--in FY82. The three-year contract is expected to save the Army over $80 million. The Black Hawk engine, the CH-47D helicopter, and the Multiple Launch Rocket System were among our FY83 nominees for multiyear awards. We are positive about multiyear contracting and plan to continue its use, but we recognize that it is not suited to every materiel acquisition program. A selected system must have validated cost savings based on a side-by-side comparison with a yearly procurement program. The systems must also have a stable design and a lower overall unit cost under the multiyear approach. We know that anticipated savings are not automatic, and we are proceeding cautiously so that we select the right acquisition strategy for each program.

o Program Management Control System. The Army is currently implementing the Program Management Control System (PMCS). PMCS will increase stability by bringing better discipline to the materiel acquisition process, increasing the visibility of program trends, and identifying programs which need more intensive management. Thirty-seven systems are presently scheduled to come under PMCS. Each will be baselined for cost, schedule, performance, quantity, production capacity, and integrated logistics support requirements. The systems will be tracked by a monthly report to detect deviations from baselines. An important feature of PMCS is that the baseline program cannot be changed without the formal approval of the Department of the Army and the Materiel Development and Readiness Command (DARCOM).

o Long-Range Planning. The Army has developed a long-range research, development, and acquisition plan to provide a focus for--and lend stability to--the materiel acquisition process. It is based on interactive and analytical considerations of future Army needs and future technological and engineering capabilities. The plan provides the Army's leadership a means by which to consider the future implications of current decisions. It facilitates the making of timely, logical, and economically sound decisions for the acquisition of materiel with a minimum of program disruption.

Better management information is the key to identifying unfavorable trends and potential problem areas while effective corrective action can still be taken. Our efforts include the following activities:

o Cost Risk Review. The Army has established a cost risk team which is responsible for examining systems that are approaching milestone reviews. This team of experts visits contractors and takes a hard look at the risk factors. A cost risk assessment is then provided to the decisionmakers. To date, risk reviews have been conducted on the SGT York air defense gun, the Position Location Reporting System (PLRS), and the Remotely Piloted Vehicle (RPV), and are in progress for Pershing II and the Maneuver Control System.

o Expanded SAR Reviews. The Army has initiated an expanded quarterly review at which the cost, schedule, and performance variances of those systems included in the Selected Acquisition Report requirement are examined. The review, which is attended by the Under Secretary of the Army and the Vice Chief of Staff, highlights problem areas and assigns responsibility for follow-on action.

o Monthly Program's Status Report. The monthly program status report begins with the program manager's candid assessment of where his program stands. The Department of the Army Staff then takes this information and adds to it other factors of which it is aware. Necessary actions are taken by the appropriate staff agency and the report is provided to the Under Secretary of the Army, the Chief of Staff and the Vice Chief of Staff.

Better and more frequent cost estimates are the key to staying abreast of program costs and minimizing unprogramed, unanticipated cost growth. The following initiatives are expected to upgrade our cost estimate record significantly:

o Annual Estimates of Major Systems (Program Manager and Independent). In the past, cost estimates were prepared only for each milestone decision review. Between reviews, the normal procedure was to accept the program manager's updated baseline estimate as the basis for budget formulation. As a result, we often went for a period of years between updates. Our procedure is being modified to require annual baseline and independent estimates of all major systems.

o Comparison Between Independent and Program Manager Estimates. The two estimates will be compared, and the higher estimate will normally be used for costing and budgeting purposes. Exceptions will require approval by the Secretary of the Army.

o Improved Cost Estimating. In addition to conducting estimates more frequently, the Comptroller of the Army has initiated a five-year program to upgrade cost analysis techniques and the data base on which they rely.

A better transition from development to production is needed to minimize the cost growth we have consistently experienced during this phase of the acquisition process. We recognize that in the past insufficient emphasis has been placed on the critical development-to-production transition. We are working to remedy that shortcoming through actions such as the following:

o Better Production and Logistics Planning. Production and logistics planning must be done throughout R&D, not just immediately before the start of production. We plan to adequately fund production and logistics planning and manage them well by tracking expenditures in the Program Management Control System. This will insure that the program manager has enough dollars and is using them as intended.

o Define Production Risks and Translate Them Into Dollars. The concept of holding risk money for application during R&D has been in use for a number of years. An extension of this concept involves providing risk dollars for the transition into the production phase. We believe that solving production difficulties as soon as they materialize will keep them from developing into full-fledged problems, thereby saving dollars in the long run.

Preplanned product improvement (P^3I) is intended to reduce development risk and cost, and to take advantage of the improvement potential which exists for new or fielded systems. The use of evolutionary alternatives rather than the development of a new system to meet a threat is a management principle which the Army has followed for some time. The product improvement (PI) programs we described earlier were based on evolutionary changes and contributed to program stability by making the system change process more systematic. The P^3I concept will enhance the product improvement approach by enabling us to plan early in the acquisition cycle for block improvements that will be needed and technologically available in the future. P^3I is an important element in the Army's determination to make the best use of what we have, while giving us needed development time to consider future requirements and preclude the use of high-risk or unproven technology.

We believe that these and other management initiatives will pay off with lower costs and a more responsive acquisition process. However, we will need your continued support. For example, multiyear procurement is an acquisition management tool that can yield substantial dividends. Increased funding in the early stages of production can lead to savings because of economic-order purchases and capital investments by industry. Planning for production and funding for production risk also take dollars at a relatively early point in the total acquisition cycle. For these programs to be successful and fully realize their potential in cost savings, continued fiscal support from Congress is necessary.

The Army's long-range planning process was mentioned previously in connection with our efforts to stabilize the acquisition process. Our long-range plan also provides focus for the Army's technology efforts and overall research and development program. This is extremely important, since we must rely on our technical capability in order to overcome Soviet quantitative and qualitative superiority. R&D funds are truly seed money for the future.

This year's long-range plan covers 15 years--FY85-99--and lays out how the Army will develop and acquire the materiel it will need to fight in the 1980's, 1990's, and beyond. It also allows us to examine affordability early in the development process. As part of the plan's formulation, Army Staff planners look to both the combat developer, who speaks for the soldier in the field, and the materiel developer, who analyzes our technology. In this fashion, the long-range plan balances our needs with production opportunities and capabilities. This balance insures that we are on the correct path to achieve the global response capability our Army requires.

In 1974, Mr. Norman Augustine, then the Assistant Secretary of the Army for Research and Development, directed that an analysis be conducted to measure the qualitative contributions which Army R&D had made during the 10-year period 1964-1974. The resultant analysis measured the difference in total effectiveness of a European Army Corps as equipped with 1964 and 1974 weapons systems in identical numbers. This analysis showed that the introduction of new and improved weapons systems from 1964 through 1974 generated about a one-third increase in the ground combat effectiveness of the corps studied. The TOW antiarmor system was judged to be at least twice as effective as the family of rocket launchers and recoilless rifles it replaced. Improved munitions for 155mm and 8-inch howitzers more than doubled the effectiveness of nondivisional artillery units. The same order of improvement was found in low- and medium-altitude air defense coverage because of the capabilities of Improved Nike-Hercules and Improved Hawk, and the relatively new Chaparral, Vulcan, and Redeye systems.

We believe that the same opportunity exists today and we must take advantage of it.

In the near future, the TOW 2 and the laser-guided Hellfire missile, the Multiple Launch Rocket System, and an entire family of new air defense weapons hold the potential for even more dramatic increases in combat effectiveness. For the long term, we are looking to a completely new family of terminally guided munitions which will provide a fire-and-forget capability to both air and ground systems, new developments in laser weapons, and means by which to transfer the burden of operations and maintenance from man to machine. Research and development dollars have made these kinds of advances possible and will also determine our future capability. Our objective is to retain technological superiority where we have it, regain it where we have lost it, and exploit it to maximize combat effectiveness.

The Army research and development program includes basic scientific research and exploratory development (referred to as our technology base) and developmental and engineering efforts directed toward improving current systems, and fielding new weapons and equipment in the near future. In the FY84 budget request, we allocate approximately 15 percent of our research and development funds to the technology base and the remainder to developmental and engineering efforts.

The battlefield of the 1990's and beyond will require Army forces that are light, agile, and lethal. These forces will have to fight a very "fluid" type of combat, often operating independently from other forces. They will have to fight outmanned and outgunned. To meet the challenges of the 1990's and beyond, the Army will place greater emphasis on "leverage" technologies which offer the potential for innovative, revolutionary change in military systems and capabilities. Examples of such technologies include:

o VHSIC (Very High Speed Integrated Circuits), that will provide substantially smaller, lighter, and faster computers and processors;

- Infrared focal plane arrays, integrated optics, and image-processing techniques that will greatly improve sensor capabilities to detect and identify targets;

- Millimeter wave technology that will guide beam rider and terminal homing missiles and artillery rounds through smoke, fog, and dust;

- Biological technologies that can be used to develop detection systems, vaccines, and antidotes;

- Artificial intelligence and robotics that can be used not only to increase machine capabilities but to reduce human time and effort.

The Army's new thrusts in technology are designed to integrate, focus, and apply leverage technologies and other existing technologies in the following areas:

- Very Intelligent Survelliance and Target Acquisition (VISTA) technologies will get much better targeting information to unit commanders in near realtime. Technology demonstrations will include ground and aerial VISTA platforms and a mobile ground combat information center.

- Distributed Command, Control, Communications, and Intelligence (DC^3I) technologies will dramatically improve reliable distribution of battlefield information among all levels of command. Technology demonstrations will include distributed command and control networks and VISTA communications networks.

- Self-contained munitions technologies will allow munitions to autonomously search out, select, and home on hostile targets. Technology demonstrations will include a fiber optic-guided missile, quiet radar for air defense systems, and a helicopter air-to-air self-defense gun system.

- Soldier-machine interface technologies will improve training, expand individual capabilities, and make it easier to operate sophisticated equipment. Technology demonstrations will include intelligence displays in combat vehicles, training devices, and robotics devices.

- Biotechnology offers the opportunity to assist in the prevention and treatment of casualties through new classes of vaccines, antidotes, and treatment compounds. Technology demonstrations will include a system for detecting chemical and biological agents, systems for rapid identification and diagnosis of disease, and various new vaccines.

Our developmental and engineering research and development efforts are oriented toward the fielding and improvement of specific systems, rather than toward the general research and testing supported in the technology base.

Such directed efforts have resulted in the development of new systems across the entire spectrum of our mission areas--the M1 tank and Bradley Fighting Vehicles, the Apache Attack Helicopter, the Patriot and Stinger air defense missiles, the Multiple Launch Rocket System, and many others. Additional systems such as the Pershing II and the Fire Support Team Vehicle (FISTV) are in the final stages of development. In addition, research and development funds support the improvement of existing systems. Such improvements range from the development of a particle separator to protect the Cobra helicopter's engine from sand and grit, to the block improvements projected for the Abrams tank.

The importance of an adequate research and development program has seldom been greater. Today the Soviet Union supports about twice the effort that we do in military research and development and is graduating five times as many engineers as we are. The quality of their weapons has continued to improve because of their past R&D investment, and, due to the size of their present program, we are now faced with the additional risk of technological surprise. With your support, we will prevent that from happening.

Throughout this discussion we have refrained from direct mention of the national resource which transforms the plans for equipping, modernizing, and conducting research and development into reality: the nation's industrial base.

The capability and responsiveness of the industrial base have been a matter of concern to all of us for some time. We in the Army have been encouraged by the recent improvements we have seen. For example, two years ago, for the first time in 20 years, the Congress appropriated funds to support additions to the National Defense Stockpile. In addition, industry now has tax incentives which support capital investment, and President Reagan and the Congress have made it clear that the reindustrialization of America is a matter of concern.

In conjunction with national efforts to reindustrialize America, the Army has increased its emphasis on that portion of industry which most directly serves its needs. Recognizing this vital area, the FY84 budget request will build on our investment in FY83. The requested funds will finance production improvements that should result in more timely and efficient peacetime procurements as well as improve industry's ability to deliver increased quantities of equipment in time of emergency or mobilization. The budget will also finance modernization of existing plants and arsenals, and willfully support the layaway and maintenance of our reserve standby plants and equipment.

The FY84 budget request will also provide resources to improve manufacturing processes and reduce production costs. The Manufacturing Technology Program seeks to improve production methods for high-cost equipment items and technologies such as explosives-manufacturing, which has limited civilian application. This program has resulted in process improvements having an average monetary payback to the Army of three to one.

Complementing this program is the Industrial Productivity Improvement Program. Although resources for this new effort are limited, the expected benefits are large. The Industrial Productivity Improvement Program is directed toward key contractor and Government plants involved in large, high-dollar production projects. Many of these plants are producing multiple products for the Army and DOD. The program initiates a top-down systems approach to modernizing an entire factory rather than piecemeal process improvements. The Army expects to stimulate more private investment by contractors if Army "seed money" finances high-risk engineering and manufacturing technology.

The Army is also working to improve the peacetime and mobilization industrial base. Surge planning clauses which require contractors to plan to accelerate production to a predetermined rate on demand are now a part of many contracts. These contractual arrangements also provide us with information on subcontractor capabilities, information that will enable the Army to identify potential bottlenecks at the subcontractor level before a surge occurs.

In order to verify the execution of mobilization plans, the Army performed a series of Plant Equipment Package activation tests during the recent mobilization exercise, MOBEX 83. These tests simulated reactivation of laidaway equipment packages for the M107 155mm projectile, the M109 howitzer, and the CH-47 helicopter. Our objective was to use these tests to illustrate both strengths and weaknesses, thereby enabling us to focus our improvements on the right aspects of the planning or equipment package. The tests have also laid the foundation for an actual Plant Equipment Package activation during a future mobilization exercise.

In addition to these measures, the existence of an automated production base analysis capability now provides us with an up-to-date means of comparing mobilization requirements with industrial base capabilities. The first edition of the automated analysis was published a year ago and gave us valuable information on both capabilities and potential shortfalls. We anticipate the second edition of this important mobilization planning tool in the near future.

If the posture of our industrial base is to improve significantly, both the Army and the Congress must remain committed to those programs which can make improvements happen. Program stability is important, but so are the Manufacturing Technology and Productivity Improvement programs which can benefit far more than just the defense portion of our national industrial base. We ask that you continue to support the steps we are taking to improve the industrial base. The United States cannot be a first-rate military power if we have to depend on a second-rate industrial base.

You are invited to continue reading through the mission area chapters that follow to gain a better appreciation of how the efforts we are making now assure us of a better Army both for today and tomorrow.

CLOSE COMBAT

The Close Combat mission area relates to weapons and equipment which are used to bring direct, line-of-sight fire upon the enemy. The soldiers who fill this role are often referred to as "frontline troops" and their job is to close with and destroy the enemy. To do so, they must be well led, well trained, and provided with the equipment that will give them an edge over their adversaries. The next several paragraphs will describe those close combat equipment systems for which we are requesting funds in the FY84 budget request. We will cover this subject area by first addressing armored and mechanized systems, then aviation systems, missile anti-tank weapons, and, finally, individual weapons.

The main offensive weapon of both the US and Soviet ground armies is the tank. In a combined arms role, tanks can dominate the battlefield, spearheading the offensive, killing other tanks, devastating "soft" targets, and driving through defensive positions with massive momentum. The tank is essential to success on the modern battlefield. The Army's new tank, the M1 Abrams, is the most powerful, mobile, and survivable combat vehicle we have ever fielded, and we believe that it can outperform any other tank on the battlefield.

M1 Abrams

The agility of a tank is a major element in the effectiveness equation. A 1500-horsepower turbine engine supplies the Abrams with double the power of its diesel-powered predecessor, the M60. Its stabilized sighting system ensures that speed is combined with accurate firepower. Tankers are able to routinely hit 5-foot targets over a mile away while moving rapidly cross-country.

This kind of on-the-move accuracy is made possible by design features of the M1's fire control and improved suspension systems. The gunner puts his sight on the target and finds the range using a laser rangefinder; a computer automatically determines the ballistic data and adjusts the lay of the main gun; the gunner need only squeeze the trigger to hit a target.

The future battlefield will be thick with antitank weapons. Therefore, the M1 tank is protected by a special type of advanced armor and its low silhouette, coupled with its agility, reduces its chances of getting hit. If an M1 is penetrated, a number of revolutionary safety features will greatly enhance crew survivability. These include an automatic fire detection/extinguishing system and armored compartments that separate the fuel tanks and main gun ammunition from the crew. The Abrams' passive thermal imaging system allows location of targets at night and through dust, haze, fog, and smoke without disclosing the tank's position.

M1 Abrams

The main armament of the Abrams tank is a 105mm rifled gun that fires chemical energy and improved kinetic energy rounds. Beginning in 1985 the Abrams will incorporate the German-designed, US-manufactured 120mm smoothbore gun. The addition of the 120mm gun to the M1 tank fleet will insure that US tanks can keep pace with improvements in Soviet armor expected in the late 1980's and beyond. The major advantages of the 120mm gun system are greater kill capability and growth potential to meet advanced threat armors.

Design criteria make interesting reading, but the real proof comes during operations by soldiers. The first three M1 battalions fielded in Germany participated in field exercise REFORGER 1982. The M1's performance was superb. MG Mahaffey, Commander of the 3d Mechanized Infantry Division in Europe, commenting on the M1's superior speed, mobility and fire-on-the-move capability said, "... I am now convinced we are on the threshold of a whole new dimension of battlefield combat capability." M1 units consistently outmaneuvered their opposing forces. Their operational performance was backed by an outstanding 97 percent operational readiness rate throughout the eleven-day exercise. The supportability of M1 units in a fast moving battlefield scenario was confirmed, and many logistics support and tactics/doctrine lessons were learned as a result of the exercise.

The soldiers' appraisal of the M1 can be summed up in one word--winner! They found the M1 Abrams easier to maintain than the M60 tank, and able to shoot more accurately while moving cross-country at high speed.

Our soldiers found that the M1 unit can cross a chaotic battlefield at better than twice the speed of an M60 unit. They know that the Abrams can take hits which would destroy an M60. Features like these increase survivability, and survivability has a big impact on a soldier's confidence--a factor that breeds fighting effectiveness that will win on the battlefield.

The Army has fielded two M1 battalions at Fort Hood, Texas, and four M1 battalions in Germany. We begin fielding the first reserve component M1 battalion, a 2d Armored Division round-out battalion, in the last quarter of FY83, underscoring our commitment to modernize the reserve component.

We are now at a production rate of 60 tanks per month. The FY84 budget will support the production of 70 per month. We have produced over 780 M1 tanks as of the end of 1982.

M60A3

The M60A3 is a quality tank that will continue to see service into the 1990's as the low element of our high-low tank mix. The high-low mix strategy is not new. It is used throughout the equipment area and is simply an acknowledgement that we cannot replace our entire fleet of M60 series tanks with the M1 in the immediate future. Accordingly, we will continue to upgrade the M60 series tanks that remain in our inventory by improving fire control systems and main gun stabilization, and building in better overall system reliability. The top-of-the-line M60A3 model incorporates a laser rangefinder and a ballistic computer for automatic ranging and lead angle computation, and a thermal sight that gives the crew an improved capability to detect targets in darkness and on an obscured battlefield. The last programed buy of new production M60A3 tanks for US forces was funded in the FY81 budget. The production line is now building the last few tanks for delivery to the US Army, while the bulk of production is to meet foreign military sales requirements. Fielded M60A1 tanks are being converted to the latest M60A3 configuration at Anniston and Mainz Army Depots. Approximately 460 tanks are being converted each year.

Just as the European theater has dictated the need for heavy armored forces, the Army's global mission has demanded an increased focus on light divisions and the needs of those divisions. Both the Army and the Marine Corps have sized up their future requirements for antiarmor systems and agree that there is an urgent requirement to provide light forces with a weapon system that is strategically deployable, tactically mobile, and capable of conducting offensive operations on the battlefield. To meet this need we are jointly executing an off-the-shelf Light Armored Vehicle (LAV) procurement program.

Piranha

The Services concluded their LAV candidate competition and awarded a five-year multiyear procurement contract to General Motors of Canada on 27 September 1982. Approximately 65 percent of the contract dollar value is planned to be subcontracted to US firms. The selected vehicle is the eight-wheeled Piranha equipped with a 25mm Bushmaster Chain Gun. The first year's buy of the Piranha was for 60 vehicles using FY82 USMC funds. Initial deliveries of the vehicles to the USMC will begin in November 1983. The FY83 Army budget included $25 million for 36 LAV's with deliveries programed for FY84. The FY84 LAV-25 budget request is for $135.5 million to procure an additional 176 LAV-25's. The Army's total LAV-25 requirement remains constant at 680 vehicles.

While the unique LAV program will provide us with a good near-term solution to the problem of providing mobility and firepower to our light forces, we are still looking to the future. We will use FY83 and FY84 funds to continue the Concept Exploration Phase of a joint far-term solution to the light force's antiarmor/assault deficiency. This joint developmental effort and in-house analysis have resulted in a solicitation of concept design studies from industry. It is our intent to continue this program on a rational course that allows a prudent examination of armament systems and armor technology to counter the threat of the mid-to-late 1990's. More specifically, we will continue to explore the development of a new lightweight armored fighting vehicle with an automatic 75mm cannon, a soft recoil automatic 105mm cannon, or a fire-and-forget hypervelocity missile system.

The history of modern warfare has vividly demonstrated that armored vehicles are critical to success on the battlefield. Operating independently, however, they are vulnerable to antitank fires from enemy infantry. Therefore, infantry must be combined with armor to assure a blend of maneuver forces that will provide the flexibility necessary to defeat any threat. In this regard, the Bradley Fighting Vehicle is an ideal partner for the M1 Abrams. This vehicle has two configurations, the Infantry Fighting Vehicle (IFV) and the Cavalry Fighting Vehicle (CFV).

The IFV provides vastly improved cross-country mobility, firepower, and armored protection to the mechanized infantry squad. In intense combat situations, the tank-infantry force must be supported on the move by continuous and accurate fire. The primary weapon of the IFV is a stabilized, dual-fed 25mm automatic cannon. The commander or gunner can

Infantry Fighting Vehicle

instantly select either high-explosive or armor-piercing rounds. The high-explosive round can destroy unarmored ground targets out to 2500 meters, while the armor-piercing rounds are capable of penetrating and defeating the Soviet BMP. The two-man turret also has a two-tube TOW missile launcher and a 7.62mm coaxial machinegun. The TOW gives each squad the capability to engage enemy tanks at long range from overwatch positions. The IFV transports a ten-man infantry squad and has additional fire-on-the-move capability through the use of modified M-16 firing port weapons for individual squad members.

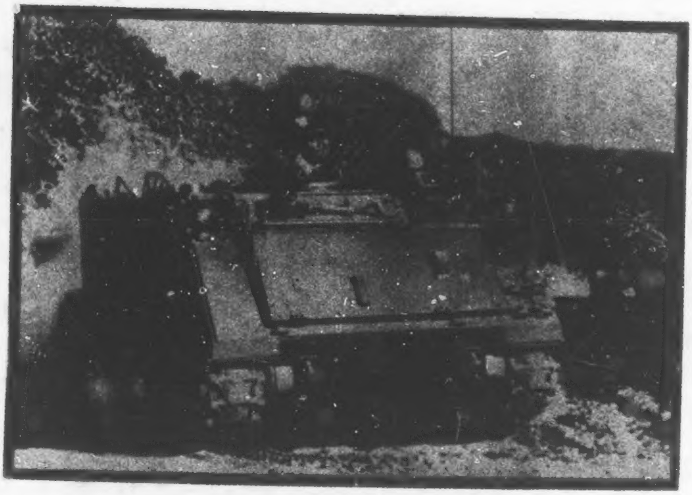
The Cavalry Fighting Vehicle (CFV) is identical to the IFV except for minor modifications for crew size and equipment. The CFV carries a five-man scout team and provides the cross-country mobility and mounted firepower necessary for armored cavalry and battalion scout squads to carry out reconnaissance, security, and economy-of-force operations.

Both the IFV and CFV have an inherent swimming capability and are air transportable in either the C-141 or C-5A aircraft. These fighting vehicles match the highway and cross-country mobility of the M1 tank. Furthermore, they provide their crews and passengers significant protection against enemy small caliber weapons, artillery airbursts and antipersonnel mines. A thermal night sight insures that this potent weapon system maintains its capability during night operations.

No fighting vehicle available in the world today matches the all-around capabilities provided by the Bradley. Although our current armored personnel carrier, the M113A2, is inherently an excellent vehicle which will remain in service for many other purposes, we need a vehicle like the Bradley that can meet the Soviet threat vehicle--the BMP--head-to-head and win.

Compared to the Bradley, the M113A2 is not as agile, is less well armored, and mounts only a 50 caliber machinegun on an unstabilized, exposed mount. The troops inside are isolated from the battlefield. The Bradley has vision blocks, through which each squad member can view the battlefield and direct fires of their individual firing port weapons, thus permitting continuous observation of, and contact with, the enemy while on the move. Once outside the vehicle, troops can move toward the objective supported by a high volume of firepower from the vehicle's 25mm cannon, 7.62mm coaxial machinegun, or the TOW missile system.

The first Bradley production vehicle was delivered to the Army in May 1981. Today, we are producing the Bradley

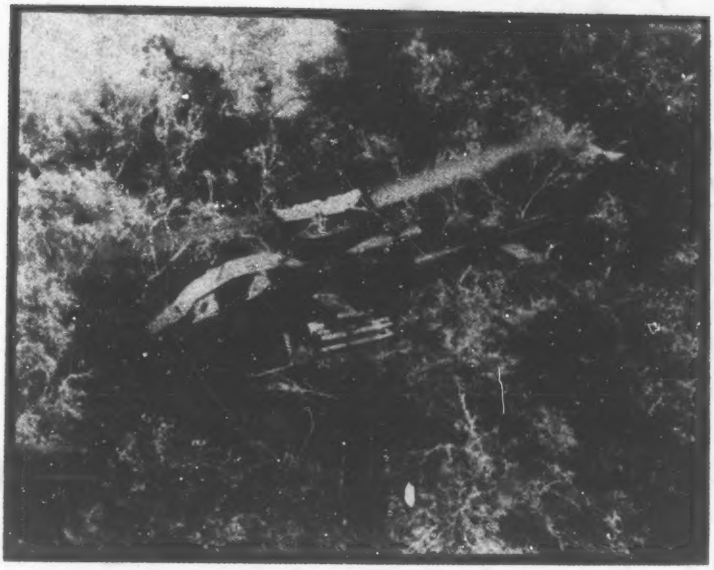


M113A2

at a rate of 50 vehicles per month. The FY84 budget supports the production of 600 Bradley vehicles. The first mechanized infantry battalion will be equipped in March 1983 at Fort Hood, Texas, and the first European battalion will be equipped in September 1983.

We move now to our attack helicopters, a key element of our Army's combat capability. A ground attack on our forces in Europe will be spearheaded by masses of armored vehicles. Soviet doctrine stresses building overwhelming momentum with blitzkrieg-like tactics. Frontages in Europe mandate that we concentrate on their main avenue of approach and quickly counter. Attack helicopters play a major role in any situation that requires our forces to react quickly. They are needed to fly rapidly across a wide front to threatened areas that cannot be reached by armored forces which are either engaged in their assigned sectors or are too far away to influence the battle. Attack helicopters can also be used to significant advantage in target-rich environments where exploitation is feasible.

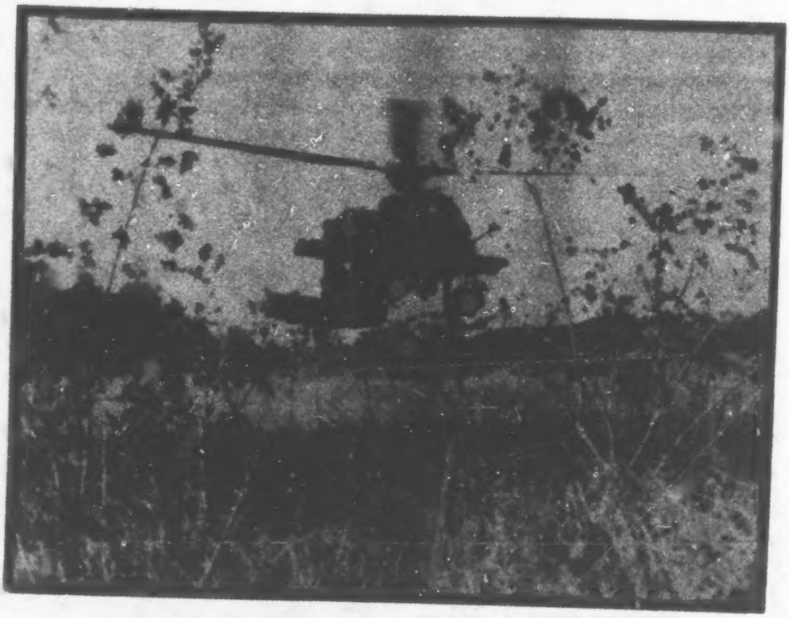
The value of attack helicopters was first shown in Vietnam where the AH-1G Cobra had considerable success against lightly armored vehicles. In addition, the TOW was put on a Huey helicopter and knocked out a number of North Vietnamese Army tanks. After Vietnam, the TOW missile was mated with the AH-1G to produce the Cobra/TOW, or AH-1S, making it a true tank-killer.



Cobra/TOW

Like the M60 series tank, the AH-1 Cobra helicopter has been continually upgraded to improve its operational capabilities, safety, and survivability. While these improvements will contribute to its effectiveness and survivability against armor, the Cobra remains essentially a daytime helicopter with limited performance capabilities when operating in a typically Middle Eastern environment. The TOW missiles that the Cobra/TOW carries are wire-guided so the launching aircraft must remain exposed until missile impact.

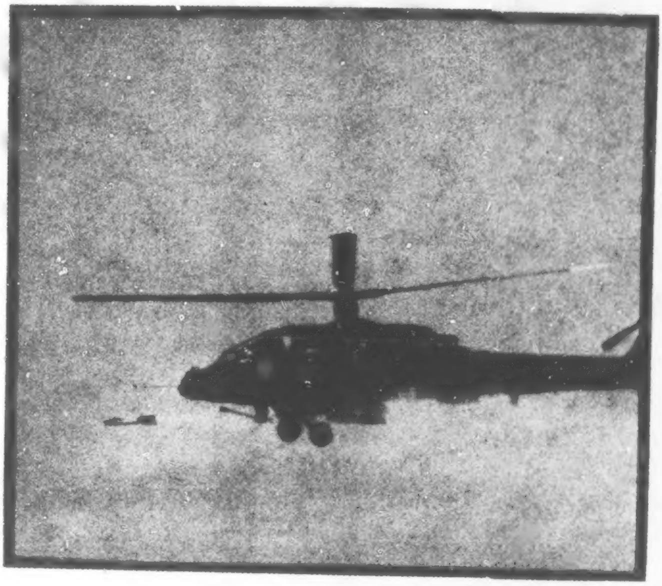
Attack helicopters will play a critical role in winning a future land battle. The large number of attack helicopters that the Soviets have fielded in recent years show that their leaders share this belief. Thus, the importance of attack helicopters, coupled with the recognition of the Cobra/TOW performance limitations, led to the development of the Apache Attack Helicopter (AH-64). Armed with the laser-guided Hellfire missile, the Apache represents a significant jump in performance, firepower, and survivability when compared with its predecessor--the Cobra. More important, the Apache provides the Army a mobile, credible, antitank capability that can be quickly deployed worldwide to areas of strategic concern well in advance of heavier antitank systems. Apache's ability to operate worldwide, in conditions that make the Cobra marginally effective, may be the difference between success or failure until more conventional, heavier forces can be deployed to meet Soviet armor.



Apache Attack Helicopter

The powerful, two-engine Apache has been designed from the start to perform anywhere in the world under the most demanding conditions of altitude and climate. Its agility enables pilots to take advantage of the terrain, vegetation, and even buildings to avoid detection. A target acquisition/designation sight and pilot night vision sensor enable the pilot to navigate and attack in darkness and on an obscured battlefield.

Apache carries a formidable array of weaponry. The main armament is the Hellfire, a third-generation antiarmor missile. Hellfire homes on a laser spot that can be projected from a number of sources including ground observers and scout helicopters, as well as the launching aircraft itself. When targets are laser-designated by another source, the AAH can fire its Hellfire missiles without exposing itself. Scout helicopters, equipped with sights and laser designators atop their rotor masts, will be able to spot and laser-designate targets without breaking cover. The AAH can then ripple-fire at multiple targets while remaining completely hidden. Hellfire provides significant improvements over the TOW system in terms of greater lethality, greater standoff range, greater tactical versatility, and shorter time of flight. Apache's other armament includes the 30mm chain gun and 2.75-inch rockets, which are lethal against a wide variety of targets and complement the antiarmor Hellfire missiles.



Apache with Hellfire

The Apache's performance characteristics, coupled with survivability features such as armor protection, redundant controls, and electronic countermeasure equipment, make it one of the most survivable systems on the battlefield. The FY84 budget provides for additional procurement of helicopters and a third buy of Hellfire missiles. The budget also funds continued survivability improvements for the Cobra.

Using scout helicopters to seek out and select targets enables attack helicopters to conserve fuel and ordnance, and allows the commander to concentrate his antitank capability at critical points and on established targets.

Currently, the Army does not have a scout helicopter that is capable of performing satisfactorily with the attack helicopter or the field artillery. The Army Helicopter Improvement Program (AHIP) will upgrade part of the OH-58 fleet into an improved scout helicopter. Engine performance and rotor improvements will make the OH-58 better able to operate in a Middle East environment, and a mast-mounted sight will incorporate a laser designator and infrared capability for night and adverse weather operations. In addition to working with attack helicopters equipped with Hellfire missiles, the Scout will have the capability to acquire and designate targets for Army or Air Force precision guided munitions.

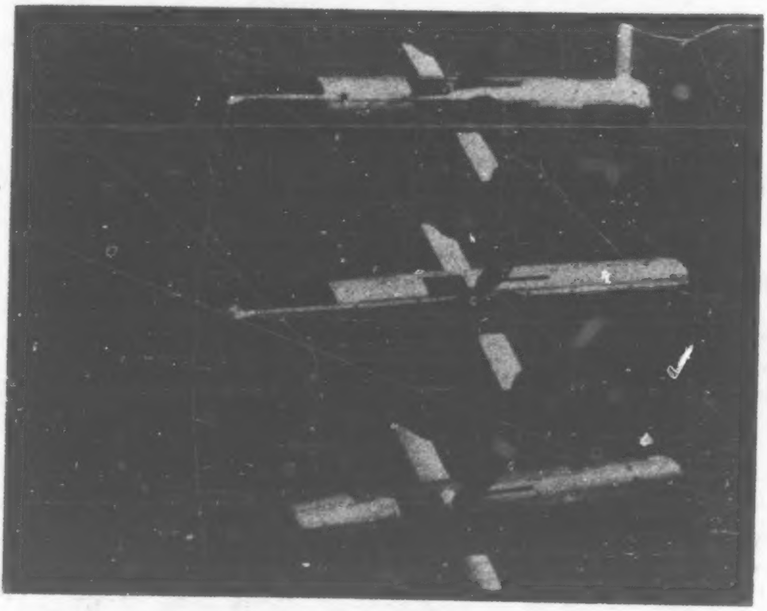
Scout Helicopter

The AHIP program, based upon modification of an existing light observation aircraft, complies with Congressional guidance and shows significant savings when compared with a new airframe development program. The FY84 budget supports continuation of full-scale development leading to developmental and operational testing of five AHIP prototypes. Procurement funding will provide advance procurement funds for FY85, procurement funds for an FY84 buy of 16 aircraft, and funds for production-line tooling.

The Hellfire missile, described earlier as the main weapon of the Apache, warrants more discussion. It is a laser-guided missile capable of employment both in direct and indirect fire modes. Mounted on the Apache, the Hellfire missile is faster and has longer range and greater killing power than the TOW. Targets can be laser-designated for it by its own launch aircraft, another attack or improved scout helicopter, or by a ground laser designator in the hands of armor, infantry, or artillery elements. This flexibility will keep the enemy guessing and limit his ability to counter the missile. The Hellfire's contribution to our combat resources makes its fielding a top priority among force modernization efforts for which we are requesting funds.

The TOW missile system, which is found on the AH-1S Cobra, the Bradley Vehicles, Improved TOW Vehicles, and with dismounted infantry, is the most powerful antitank weapon used by ground units. This long-range (3750 meters) antiarmor system is a prime example of evolutionary development. First fielded in the late 1960's, the TOW is being improved to keep pace with the evolving Soviet tank threat.

The first upgrade, completed in 1981, is an improved 5-inch-diameter warhead that provides TOW a greater armor-piercing capability. The improved 5-inch warhead can be fitted on all existing TOW missiles and is compatible with



TOW 2, Improved TOW,
Basic TOW (top to bottom)

all TOW system platforms including helicopters and tracked vehicles. The latest improvement, called TOW 2, will give the weapon an even more lethal 6-inch warhead, greater speed to reduce vulnerability, and improved guidance in an "obscured battlefield" environment. The TOW 2 has been tested on a variety of mounts to include the 1/4-ton truck, a ground mount, the M113 armored personnel carrier, and the Improved TOW Vehicle. Deliveries of TOW 2 will begin in 1983.

The Improved TOW Vehicle, or ITV, combines two existing weapon systems, the TOW missile and a modified M113 armored personnel carrier. The system can fire two TOW missiles from its elevated armored launcher, and enables the crew to fire and reload under armor protection. In addition, the elevated launcher enables the crew to fire while the vehicle itself is hidden by vegetation or a terrain feature. Troop acceptance of the ITV has been excellent. Armored cavalry units are being equipped with the ITV until Cavalry Fighting Vehicles are available. At that time, the ITV's will be reassigned to lower priority claimants.

Improved TOW Vehicle

A close-in, final protective, antiarmor weapon is vital to the survival of defending forces when confronted by enemy armor. The Viper is designed to provide the antiarmor capability required in such critical situations.

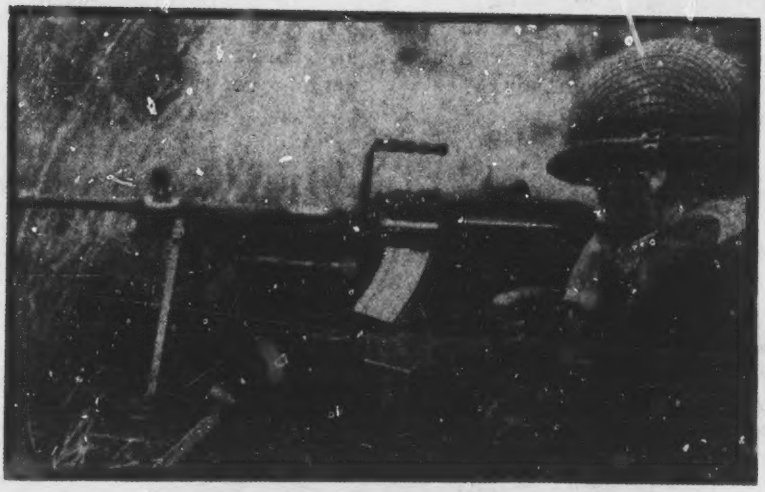
Viper is a marked improvement over its predecessor, the M72 LAW. In addition to its antiarmor capability, it also has a significant capability against mechanized, motorized and materiel targets. It is lightweight, proliferable, easy to handle, and can be issued to any solider.

Viper

Viper provides small dispersed elements with a lightweight shock and suppressive capability against a wide variety of targets. Throughout the depth of the battlefield, Viper can be employed to engage such targets as bunkers, crew-served weapons, lightly armored and reconnaissance vehicles. antiaircraft guns, and trucks as well as tanks. It is well-suited for engaging fortified positions or for use in builtup areas, and is ideal for use in combat patrols such as those conducted by our infantry and ranger units. In short, we need Viper for the versatility and the flexibility it adds to our combat capability.

The cost of Viper remains a concern. The Army and Marine Corps are jointly evaluating alternative lightweight anti-armor weapons as directed by Congress. The screening phase of these tests will be completed this summer and be followed by a report to Congress shortly thereafter. If results of the screening indicate that a candidate system meets the Army's requirements and is, in fact, less expensive, we will conduct full developmental and operational tests to support procurement of the system. The Army remains committed to the impartial assessment of alternative systems and to the procurement of the most cost effective system that meets our requirements.

As the rifle squad is the ultimate focus of close combat, it must have the capability to provide effective automatic weapon fire. The squad's organic small arms systems now include the M16A1 rifle and the M203 grenade launcher. Two soldiers are designated as automatic riflemen and are provided M16A1 bipods to support the weapon and to improve the accuracy of automatic fire. Even with the bipods, the maximum effective range of the automatic fire is less than 500 meters. In order to improve both the accuracy and range of the rifle squad's automatic fire, we are buying a new squad automatic weapon (SAW).



Squad Automatic Weapon

The SAW is a lightweight, manportable machinegun capable of delivering a heavy volume of effective fire up to a range of 800 meters. It will provide increased range and volume of fire, and better penetration than the automatic M16A1 rifle. The fielding of this weapon will provide a significant increase in the squad's overall firepower capability. The 1984 budget will permit the procurement of 2000 systems.

The mortar, although an indirect fire weapon, is included in the close combat mission area since it is used by forward combat units. For many years, the infantry has relied upon two separate mortar systems to provide the volume and variety of fires needed on the battlefield. The 81mm mortar answers the need for a relatively lightweight system that can deliver a high rate of fire at ranges up to about 5.5 kilometers. The 4.2-inch mortar, which is somewhat heavier, provides about 1.5 kilometers of additional range and delivers a more lethal round of ammunition. The Army will replace its present 81mm mortars and some 4.2-inch mortars with an improved 81mm mortar which incorporates a British-manufactured mortar barrel with bipod mount and a US base plate and sight. It will fire an improved high-explosive round that will accommodate a multioption fuze and achieve extended ranges, increased accuracy, and improved lethality. Improved smoke and illumination projectiles are also under development.

Nightfall will no longer bring down a curtain on battle activities. Because of advanced night vision devices, night will simply mean a slightly altered environment to soldiers in a future war. Night battles were conducted in the 1973 Mideast war in total darkness. A noncombatant would have seen only the light of muzzle flashes and burning vehicles, yet both sides were exchanging accurate fire using night vision devices.

Until recently, devices to assist the soldier to "see" in the dark have had serious drawbacks. For example the use of active infrared night vision devices dating back to before the Korean War "actively" emitted infrared light by which targets could be seen by looking through special lenses. However, if the enemy was also wearing special lenses, he could pinpoint the user as surely as if he had turned on a flashlight.

The latest night vision devices use passive thermal imaging. By sensing the temperature differences between objects and their surroundings, these devices can differentiate or "see" tanks, trees, people, and anything else that has a temperature signature. These devices are sensitive enough to see through haze or fog; more important, they can see through the smoke that the Soviet units rely on to mask their armor movements. This is a technology area in which we clearly lead the Soviets. Night vision equipment is now in our ground forces for major systems such as TOW and Dragon antiarmor missiles and M60A3 and M1 tanks.

The surveillance, target acquisition, and night observation--STANO--systems lend new force to the military adage that "what can be seen can be hit." By reducing the enemy's capability to mass his forces and achieve surprise under the cover of darkness, these systems rob him of two of his most effective tactics. Likewise, these STANO systems play a critical role in mounting a counterattack against superior manpower and hardware.

This concludes our overview of the close combat mission area and we will now move to the fire support mission area to discuss how the frontline soldiers are supported.

FIRE SUPPORT

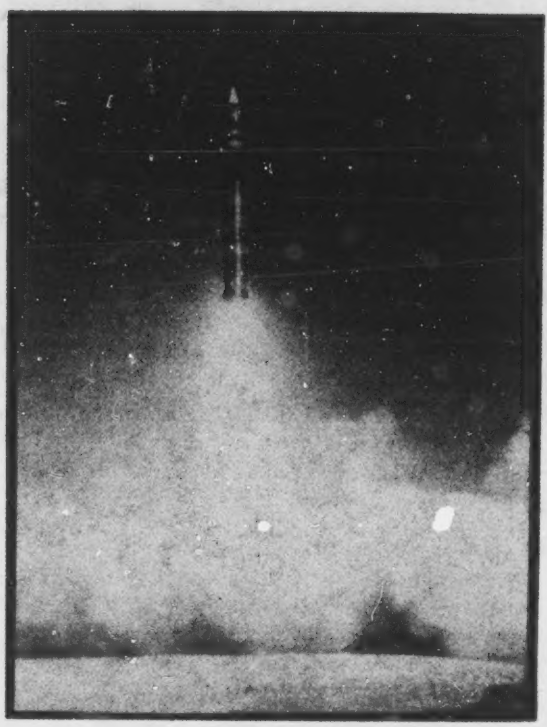
The Fire Support mission area includes those systems that are used to generate indirect firepower. The systems in this mission area include not only conventional, nuclear, and chemical firepower provided by cannons, rockets, and missile systems, but also the target acquisition and fire control elements integral to field artillery systems. This section will address the Army's longest range systems first and then will discuss direct support artillery weapons, the fire control and target acquisition systems, and finally ammunition developments.

Soviet doctrine emphasizes the use of mass and echelonment in depth. Warsaw Pact forces believe that they can afford to attack with successive waves of forces, accepting massive losses of men and materiel as an acceptable price to pay for victory. We must, therefore, be able to strike early and strike deep with great accuracy and massive firepower. We must also be capable of attacking his units up to the forward edge of our troop positions with concentrated, accurate, and readily available firepower.

The Soviets' early use of their own artillery will make this task even more difficult. Their doctrine stresses the use of concentrated artillery fire in coordination with blitzkrieg manuever of troops. The Soviets greatly outnumber us in artillery and are capable of pounding our positions with massive amounts of indirect fires. Our own field artillery must be able to neutralize their indirect fire systems through effective counterfire.

Our current field artillery capability simply does not measure up very well against the requirements stated above. Until we get more of our new systems in the field, we will remain outnumbered, outgunned,and outranged by the Soviets. Fortunately, our new systems provide across-the-board improvements, and in many cases add new dimensions to our field artillery capabilities.

The Army's most powerful weapon is the Pershing II, which has more than twice the range of the existing Pershing Ia and better accuracy. The Pershing II system employs radar area correlation to achieve its pinpoint accuracy. Radar "pictures" of the target area, in cassette form, are inserted into the missile prior to launch. As the reentry vehicle approaches the general target area, it takes its own radar "pictures" of the terrain, comparing them to the original. By making course corrections until the two pictures coincide, the missile can achieve surgical accuracy. This permits the use of a relatively small nuclear warhead that reduces collateral damage to the minimum. Pershing II is in full-scale



Pershing II

engineering development and is scheduled to be deployed in December 1983. FY84 funds will support the completion of the engineering development program and the third production buy.

The Lance missile system, which was fielded in the mid-1970's, is the Army's answer to the requirement for early attack on second-echelon enemy formations and for delivery of short- to medium-range nuclear fires. Lance can deliver a conventional warhead containing some 1,000 pounds of bomblets to a target located more than 70 kilometers away. Enemy logistics facilities, air defense sites, and communications centers are prime targets for this warhead. Because of the age and shortcomings of the Lance, a follow-on, the Joint Tactical Missile System (JTACMS), is now being explored as a weapon for the late 1980's/early 1990's.

The JTACMS, envisioned as an improved conventional, nuclear, and chemical weapon system, will overcome many of the Lance's inherent disadvantages (e.g., slow rate of fire, manpower intensity). The system will be used by the corps to destroy, delay, or neutralize enemy forces beyond the range of cannons and rockets. The corps, by slowing down the enemy's ability to reinforce and support the central battle, can thereby overcome the expected unfavorable force ratio. The JTACMS program was created when the Army's Corps Support Weapon System (CSWS) and the Air Force's Conventional Standoff Weapon (CSW) were merged by the The Office of the Secretary of Defense on 30 June 1982. The services will jointly develop a missile that meets the needs of each for deep interdiction and the attack of second echelon enemy forces.

While we must be prepared for both nuclear and nonnuclear contingencies, our first response capability must be adequate conventional firepower. As enemy units advance, there may be critical periods when large numbers of targets threaten to overwhelm the capacity of tube artillery. When this happens, we must be able to strike deep with great accuracy and massive firepower, as well as be capable of attacking enemy units up to the forward edge of our troop positions with concentrated, responsive fire.

Multiple Launch Rocket System

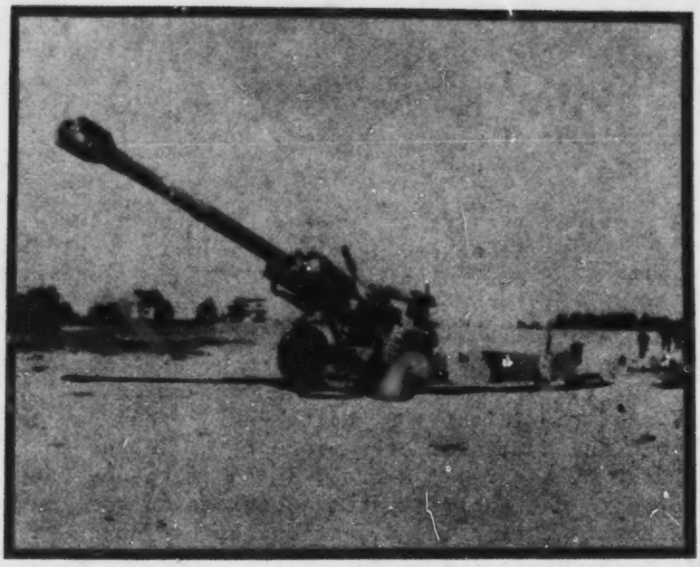
The Multiple Launch Rocket System (MLRS) is the system that fills this need. It will provide the Army with its first multiple rocket artillery capability since World War II. The MLRS rocket warheads contain a large number of improved conventional submunitions which are dispensed from the rocket high over the target and blanket the area with explosives and fragments. These submunitions are devastating against targets such as air defense sites, artillery positions, and troops in the open. The submunitions are also effective against the thin top armor of tanks and other fighting vehicles. The MLRS will be used primarily against concentrations of enemy vehicles, enemy artillery, and as an air defense suppression means.

The MLRS provides massive firepower. More than three 8-inch artillery battalions, firing simultaneously, would be required to deliver an equivalent number of submunitions as one launcher-load of 12 MLRS rockets. The system also has incorporated a number of built-in efficiencies. The rockets are sealed in pods for shipment and require no maintenance after leaving the factory. The MLRS tracked carrier vehicle is a derivative of the Infantry Fighting Vehicle and has the same power train and armor for crew protection. Although normally operated by a three-man crew, in an emergency one soldier can operate the entire system. Devices on the launcher can determine both location and direction, and an on-board computer unit computes fire commands, sets fuzes, and automatically fires the rockets. The passenger compartment also has a positive overpressure system for NBC protection.

The MLRS is being developed by the US in cooperation with Germany, France, the United Kingdom, and Italy. In conjunction with Germany, France, and the United Kingdom, we are pursuing the development of a Terminal Guidance Warhead (TGW). This warhead will enable the MLRS to attack hard point targets in excess of 30 kilometers from the launcher. The concept calls for a rocket to fly to the kill zone, where the warhead will discard multiple submunitions that seek out and destroy enemy targets.

The Army is proud of the MLRS program. It is being managed within cost, schedule, and technical thresholds, and its competitive acquisition program is a well-known success story. The FY84 budget will fund residual R&D efforts resulting from the Operational Test (OT) III and continue procurement of this important new system.

The M198, 155mm Towed Howitzer, which is now being fielded in light divisions and separate maneuver brigades, is our newest howitzer. It is capable of firing 30 kilometers using a rocket-assisted projectile. The M198 provides major increases in range and reliability over its predecessor howitzers and may be delivered by parachute or carried by a variety of cargo aircraft and the CH-47 helicopter. The M198, like other howitzers, can fire scatterable mines, nuclear rounds, Improved Conventional Munitions (ICM's), conventional high explosives, and Copperhead. It will be a major firepower improvement in the light part of our force. Although our budget does not



M198

contain M198 procurement funds for this fiscal year, our long-range plan forecasts additional procurements beginning in FY85 and continuing through FY88.

The mechanized and armored portions of our force structure have the M109 self-propelled 155mm howitzer and the M110 8-inch self-propelled howitzer. Both of these weapons date back to the 1960's, but have been improved over the intervening years. We have extended the range of the 155mm howitzer to 24 kilometers and the range of the 8-inch howitzer to 29 kilometers by using rocket-assisted projectiles.

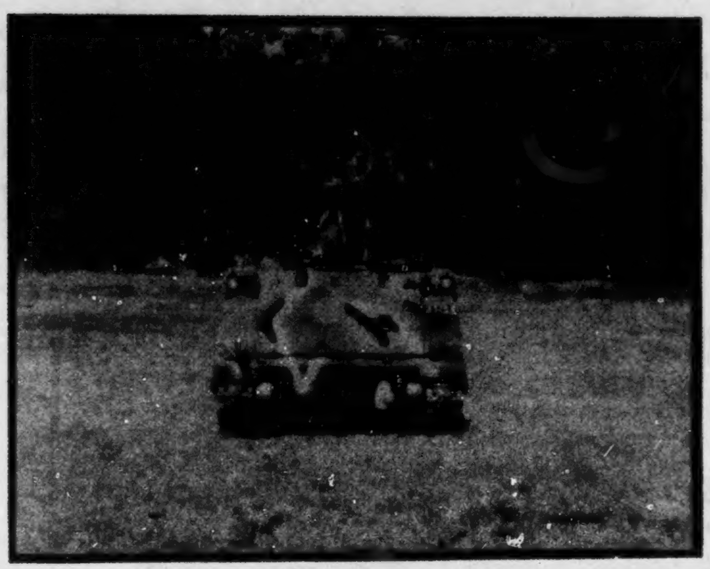
The improvements we are making in our cannon artillery units will still leave us deficient in some ways vis-a-vis the Soviet artillery. If we are to gain an edge, it must be on the qualitative side of the ledger. While there are still improvements that can be made to the howitzer in the areas of automatic position location, gun pointing, and chemical protection, we are also directing our technology efforts toward improving the means of target acquisition and fire control, as well as the munitions that can add so much to the capabilities of these basic weapons.

The Ground Laser Locator Designator (GLLD) is used by artillery forward observers. This dual-purpose device can be used by a forward observer to determine target range precisely and to illuminate targets for laser-guided projectiles, missiles, or bombs. The GLLD achieved its initial operational capability last summer, and the FY84 budget provides for continued procurement.

Ground Laser Locator Designator

The GLLD will provide the forward observer with an improved capability, but it also places greater demands on him to transport and employ the equipment. Presently, the Fire Support Team (FIST) must dismount from its M113 armored personnel carrier or Jeep to use the GLLD on a ground-mounted tripod. The new Fire Support Team Vehicle (FISTV) will give the FIST armor protection, mobility, and built-in communications which will enable it to operate with fast-moving armor, mechanized infantry, and cavalry units, and be responsive to the maneuver commander.

The FISTV represents a combination of new laser technology with the proven performance of the M113. The vehicle is very similar in appearance to the Improved TOW Vehicle and incorporates the GLLD in an armored, elevated module mounted on an M113 body. The FISTV is equipped with a north-seeking gyro that provides the directional data needed for accurate artillery fire requests. It can operate



Fire Support Team Vehicle

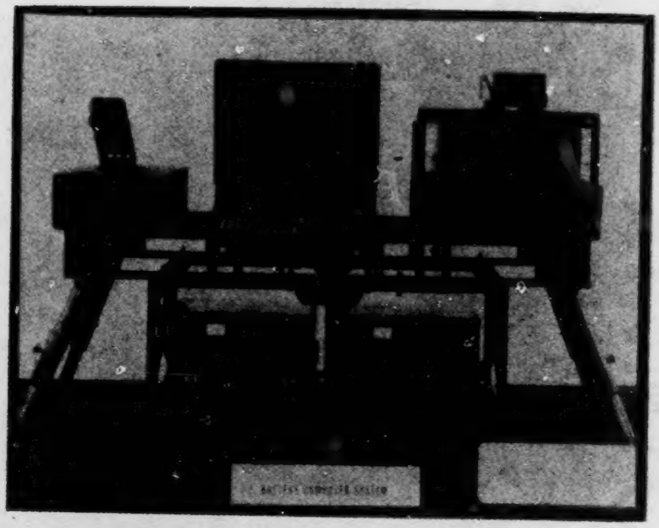
in hull defilade with only the elevated GLLD module exposed, thereby increasing survivability. FY84 funds will provide for procurement of 212 FISTV Modification Kits.

An awesome challenge to our artillerymen on today's battlefield is the effective management of the enhanced firepower capability we have been describing. Our tactical fire direction system (TACFIRE) provides an automated data processing system that makes rapid reaction and efficient engagement possible. Testing has shown TACFIRE to be approximately twice as fast as the old manual system and more than ten times as effective when considering selection of munitions, volume of fire, and accuracy.

TACFIRE procurement has now been completed for the active forces. Fielding continued last year, with the 3d Infantry and 9th Infantry Divisions becoming operational TACFIRE units. In order to keep our command and control effective and efficient on future battlefields, we have begun development of the Advanced Field Artillery Tactical Data System (AFATDS). This system will use proven concepts from TACFIRE and take advantage of TACFIRE's modular design to develop an evolutionary follow-on system. FY84 funds will be used to continue development of the Communication Control Subsystem, the first phase of the AFATDS system.

TACFIRE

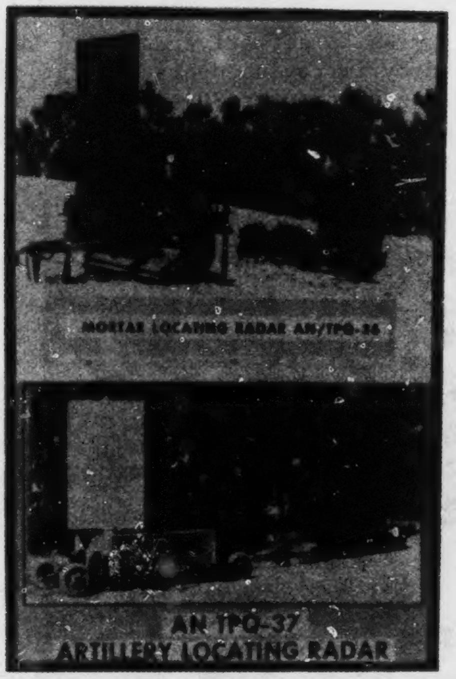
Overall artillery mission effectiveness will be significantly increased by improving operations at battery level as well. The Battery Computer System (BCS) is a



Battery Computer System

vehicular-mounted, gunnery-related computer system. It will replace the TACFIRE battery display unit and the obsolete Field Artillery Digital Automatic Computer (FADAC) in artillery batteries. The BCS provides firing data to each individual weapon through an automatic digital link from the battery computer unit to the gun display units. The BCS performs ballistic computations for individual weapons and will interface with TACFIRE. It increases mission effectiveness by reducing response time, improves weapon effectiveness by providing individual weapon firing data, and increases battlefield survivability by enabling better use of terrain. The Army intends to acquire the BCS for both active and reserve forces. FY82 funds completed the buy required to outfit the active force. FY84 funds will continue procurement of BCS for Army National Guard and Reserve units.

Target acquisition within the fire support mission area is of equal importance to fire delivery and control systems. The Firefinder system, consisting of AN/TPQ-36 mortar-locating radar and AN/TPQ-37 artillery-locating radar, will give our soldiers the ability to automatically detect and locate enemy batteries in realtime and to attack them with timely and accurate counterbattery fire. Through interface with the TACFIRE system, radar location data can be sent to



our guns before the first enemy round hits. The combination of these automatic counterbattery radars with the automated TACFIRE and BCS system is an excellent example of the complementary nature of our new systems. Such advances would not have been possible without a balanced research and development program.

The effective use of field artillery weapons depends upon accurate location, direction, and estimates of the influence of the atmosphere on artillery projectiles, rockets, and missiles as they travel to their targets. We now have automated systems to provide these data.

The Position and Azimuth Determination System (PADS) is an automated, self-contained inertial surveying system which will provide the field artillery with a secure, all-weather, day/night means for rapid survey control. Surveys that normally take the conventional eight-man surveying party several days can now be accomplished by a two-man PADS party in a matter of a few hours. PADS will continue to be fielded this year.

We need the new Meteorological Data System, MDS, to insure that artillery fires are adjusted to account for changing atmospheric conditions across a broad front. Greatly increased ranges of artillery projectiles will cause them to be exposed to atmospheric effects for increased periods of time. Reliable data are also required on how weather affects electronic warfare and battlefield obscurants employed by the enemy. In a "dirty battlefield" environment where anything from a severe storm to chemical or nuclear conditions can prevail, we must have timely meteorological data. The MDS will fill our needs by accurately measuring the atmospheric variations and automatically transmitting those variations to the TACFIRE and other automated systems that compute artillery firing commands. MDS uses a six-man section, provides data hourly on an automated basis, and can collect data while on the move. FY84 funds will be used to continue the second year of production.

Ammunition has been justly called the lifeblood of the artillery. In fact, it is essential to all elements of the combined arms force. Our ammunition request provides for improvement of near-term readiness, new munitions associated with modernization of Army forces, annual training needs, and a modest increase to sustainabiity. We also seek to modernize some existing World War II facilities that are deteriorating, as well as to provide the production capability for new ammunition items.

The field artillery has been allotted the largest portion of our resources for ammunition procurement. Major items in this category are 8-inch and 155mm Improved Conventional Munitions, 155mm Area Denial Munitions and Remote Antiarmor mine system projectiles. Other significant categories include tank gun, small arms, mortar ammunition, and ground and helicopter-dispersed scatterable mines.

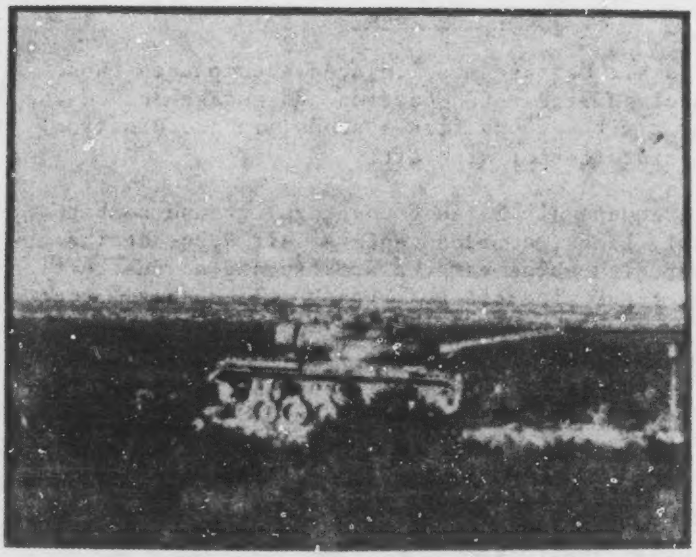
Opportunities exist for making our weapons more effective through the use of modern munitions, advanced guidance systems, and terminal delivery systems. By making greater use of these technologies we can achieve a significant increase in our conventional capability in a cost-effective and timely fashion.

The munitions research and development programs cover all types of conventional munitions from exploratory development through engineering development. Major areas include: technical base programs for large caliber munitions development and ballistics technology work applicable to all systems; development of modernized ammunition for the 105mm tank fleet; development of the German 120mm gun system for introduction on the Abrams tank in the mid-1980's; field artillery munitions such as the Sense and Destroy Armor projectile--a top attack, antiarmor submunition; numerous smaller projects for development of fuzes and propellants; and research and development of mine and countermine systems.

A successful product of munitions research and development is the "smart" projectile known as Copperhead. Until the advent of Copperhead, the field artilleryman faced the statistical probability of wearing out his gun tube before hitting a moving tank. This laser-guided 155mm howitzer projectile will change these odds dramatically.

Copperhead is fired using existing 155mm howitzers. It uses a built-in, semi-active laser seeker which makes it possible for the round to destroy stationary or moving armored targets, with a high single shot kill probability. As the projectile descends toward the intended target, its laser seeker searches for and acquires the reflections of a laser beam. This beam can be projected onto the target by an AHIP or Apache or by a remotely piloted vehicle. The projectile corrects its course through the use of its fins as it "homes" to the laser spot on the target. Copperhead can hit targets at ranges up to 16km.

Copperhead is currently in production and fielding began in 1982. The FY84 program will procure Copperhead rounds to meet the requirements of the Rapid Deployment Joint Task Force (RDJTF).



Copperhead

As a part of our modernization effort, we are also looking at improvements in ammunition hauling, handling, and survivability. In FY83 we initiated procurement of the Field Artillery Ammunition Support Vehicle (FAASV) which is equal in mobility to the self-propelled howitzers in our inventory and provides armored protection for both crew and ammunition. FAASV is being procured for deployment in Europe only. The FY84 request continues FAASV procurement.

Field Artillery Ammunition Support Vehicle

AIR DEFENSE

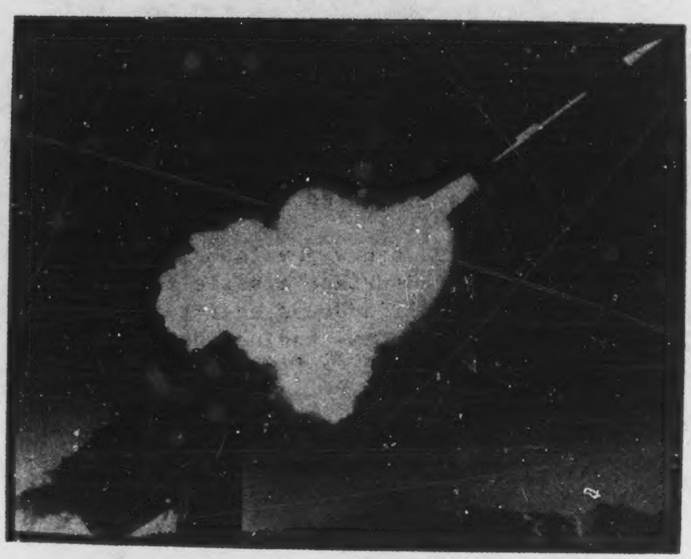
The Army's Air Defense mission area encompasses those activities involved with the detection and engagement of the enemy air threat with ground fire systems, in coordination with Air Force interceptor aircraft.

Without adequate Air Defense coverage, ground combat elements, supply lines, command centers, Air Force strike bases and other high-value targets are exposed to destruction by fixed-wing attack aircraft and attack helicopters. Pact forces have over 3,000 combat aircraft in Central Europe, including bombers, fighters, and helicopters. Quality and quantity are on the rise. Ground attack aircraft such as Flogger, Fencer, the Ground Support Fighter, and the Hind attack helicopter pose a deadly threat to armor and mechanized forces. The number of tactical ballistic missiles and air-launched missiles is increasing. Without adequate air defense protection, ground combat forces and support elements will be seriously jeopardized.

For many years, our air defense needs have been served by Redeye, Vulcan, and Chaparral--the short-range Air Defense systems, and the high- to medium-altitude Air Defense capability, which includes I-Hawk and Nike-Hercules. The Army's air defense modernization plan will permit a mix of systems to be fielded that will be effective against the postulated air threat into the 1990's. In this section, we will first discuss our most capable air defense system, Patriot, and work our way to the manportable Stinger air defense weapon.

In the future, we can expect to experience saturation raids by large numbers of sophisticated aircraft employing electronic countermeasures. Intense electronic jamming and limited firepower capabilities threaten the usefulness of our current systems, Nike-Hercules and Hawk. Therefore, we are fielding Patriot, which can overcome the expected threat.

Patriot can simultaneously attack and destroy several enemy aircraft while tracking scores more. One of the main shortcomings of Hercules, which has been in the force since 1958, is that one battery can engage only one aircraft at a time. The operator has to wait until the first missile goes all the way out to the target and detonates before firing another.



Patriot

Patriot employs a new guidance concept called Track-Via-Missile. As the missile reaches the area of an enemy aircraft, it informs the radar where it is in relation to the target. A computer then makes calculations and directs the missile on a path that insures a kill.

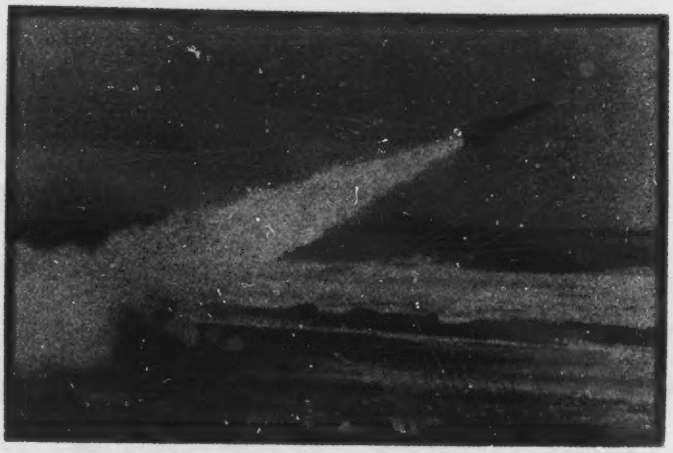
Due to its advanced technology, Patriot is operated with fewer soldiers than its predecessors. Each Patriot launching station contains four ready-to-fire missiles. The missiles, which are sealed in a canister that serves as both a shipping container and a launcher tube, require no field maintenance. The Patriot system employs up to eight truck-mounted launchers that can be widely dispersed. Communication with the Engagement Control Station is made via secure data link.

Enemy targets can be tracked and prioritized for destruction through the interaction of Patriot's radar and computer. The radar can guide several missiles at the same time, updating priorities as threat aircraft simultaneously disappear from the screen and sky. Operating modes vary from manual mode to fully automatic mode. The system's two operators always retain full override capability over computer decisions.

The Patriot system is currently in production and is being considered for adoption by our NATO allies and the government of Japan. The FY84 budget will support the procurement of additional fire units and support the fielding of the system, which will continue through 1990. It is the world's finest air defense system and can defeat any aircraft in existence today or anticipated for development.

In FY83 the Army initiated a new development program to counter the tactical surface-to-surface missile threat. The antitactical missile program will address near-term improvements to existing air defense systems and new developments to counter the long-term postulated tactical missile threat.

The mainstay of the Army's low- to medium-altitude air defense has been the Improved Hawk missile system (I-Hawk). Although Patriot will replace some I-Hawk units and all Nike Hercules Systems, an I-Hawk force will be retained indefinitely. Ongoing and planned product improvements will significantly upgrade I-Hawk system performance to meet the projected threat of the 80's. The upgraded version will have a simultaneous engagement capability against close-in saturation attackers, increased detection range, improved reliability, and greater effectiveness against jamming. Twenty foreign countries have bought the system, and procurement interest has been expressed by several others. Part of this

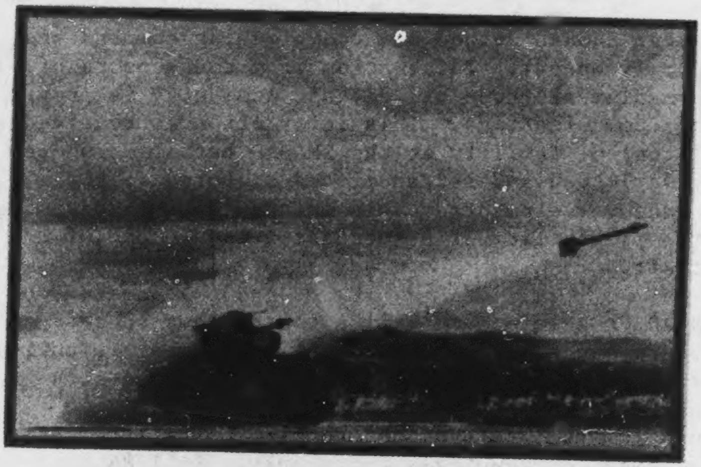


Improved Hawk

worldwide acceptance can be attributed to Hawk's showing in the 1973 Mideast war, where, in its basic configuration, it downed more than 20 MIG's and other aircraft. The FY84 budget will fund continued product improvements and procurement of replacement rocket motors.

The US Roland air defense system had been planned for acquisition to fill the requirement for a day/night, all-weather, short-range air defense missile system. Because of affordability considerations, the US Roland program was terminated during the development of the FY83 budget request. In order to gain some return on prior investments in Roland and to improve the air defense capability of the Rapid Deployment Force, the program was restructured to field a CONUS-based, 27-fire-unit light battalion under the control of the Army National Guard.

Chaparral, the Army's short-range air defense missile system, was first fielded in 1969. It will remain in the active inventory through the 1990's, and beginning in 1985 will be provided to our reserve component forces. To keep the system current, Chaparral has been and continues to be product-improved to increase its capability against the threat and to improve its operability and maintainability.



Chaparral

Significant, already-completed improvements for Chaparral include improved infrared missile guidance which provides a forward engagement capability, an Identification Friend or Foe (IFF) device to assist the gunner in identifying friendly aircraft, and a smokeless rocket motor to reduce the visible smoketrails when missiles are launched.

For FY84 the Chaparral effort will focus on development of missile improvements and on providing a towed, lightweight version of Chaparral for use with the light, rapid deployment forces. Chaparral, as a self-propelled system, is too heavy in terms of strategic airlift requirements for use with the light divisions. The lightweight version will double strategic transportability and be liftable by the Black Hawk helicopter. The missile improvement program will provide Chaparral infrared countermeasures, hardened guidance, and significantly increased engagement range.

Chaparral is effective against all types of aircraft at low altitude. It is used to provide protection for divisional and rear area critical assets to include air bases. Chaparral, with programed improvements, is the most cost-effective short-range air defense missile system option available to the Army. Further evolution of Chaparral is under study to provide effective, low-cost air defense beyond the 1990's.

The Short-Range Air Defense Command and Control (SHORAD C^2) system is being developed to allow more effective utilization of short-range air defense weapons. This C^2 effort focuses on increasing the probability of successful engagement of hostile targets, improving our capability for aircraft identification, and insuring timely dissemination of C^2 information.

The present SHORAD method of accomplishing command and control is purely manual. Information from the sensors of the high- to medium-altitude air defense community is provided through voice communications. This information is received at a central control facility at the SHORAD battalion where it is manually plotted and retransmitted by voice to the appropriate maneuver elements. This method is time-consuming and limits the probability of a successful engagement of a hostile aircraft.

The SHORAD C^2 development will automate this process and enable us to successfully engage the air threat we anticipate within the division airspace. Computer processors and data links will replace most human actions and voice communications in order to provide the fire units with the required engagement data quickly and simply. In FY84 the program will progress into full-scale engineering development.

In order for our forward ground combat forces to survive Soviet air attacks, we require a quick-reaction air defense system with mobility and armor protection comparable to that of our mechanized and armored close combat units. The SGT York gun system meets that requirement.

SGT York

The present 20mm Vulcan System cannot provide adequate protection to rapidly moving armored and mechanized forces. With its longer range, larger caliber gun, armor protection, and full-tracked mobility, SGT York will be able to defeat both low-flying, fixed-wing aircraft and helicopters. Attack helicopters--firing antitank guided missiles--pose a threat to our forward maneuver forces, a threat that is growing quantitatively and qualitatively every year. The SGT York gun is the only ground air defense system specifically designed to counter this threat. Its advanced radars detect aircraft and helicopters and automatically provide the location data for aiming the gun to the onboard digital computer, providing the rapid reaction capability necessary to counter the threat. The SGT York system fires 40mm high-explosive, point-detonating or proximity-fuzed ammunition. In addition to its air defense role, SGT York can also be fired in self-defense to destroy lightly armored combat vehicles.

The SGT York gun development program is worthy of special mention. A competitive development was conducted between contractors employing existing European cannons and US fire control systems. The chassis employed in the competition was taken from a modified M48A5 tank. The result has been a less costly, more effective system delivered in a very timely manner. FY84 funding will procure 130 SGT York gun systems and the ammunition to support them.

Stinger is the Army's manportable air defense missile system. It provides air defense protection for forward deployed ground combat units. Stinger was developed to replace the aging Redeye system, which was first fielded in the mid-1960's, and which has limitations when matched against the current and projected enemy air threat.

Stinger

Stinger overcomes many of Redeye's shortcomings with improved range and maneuverability, the ability to attack much faster targets, and, most important, the ability to attack aircraft from any angle. The missile uses a passive infrared seeker that homes on the exhaust plume of a target. A proportional navigation system enables the Stinger to fly an intercept course to the target. The high-explosive warhead is designed to penetrate the aircraft before exploding so as to insure a kill. These capabilities provide an enormous advantage over the Redeye system, which is a "revenge" or tail-chase system only.

Stinger was designed with growth potential in mind and an improved Stinger seeker, Stinger-POST, completed development last year. This seeker will improve Stinger performance in a countermeasures environment. The Stinger missile was initially deployed to active Army units in Europe in February 1981. FY84 funding will complete the procurement of Basic Stinger and will continue production of Stinger-POST.

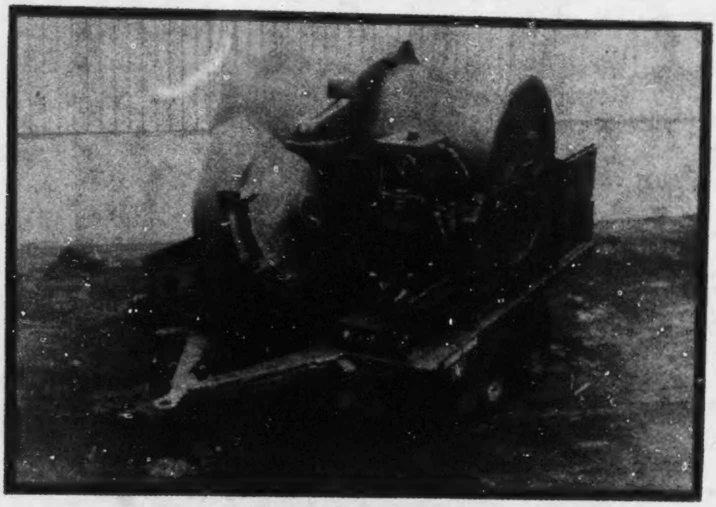
The importance of getting our new air defense systems to the field cannot be overemphasized. They will provide great improvements in capability as well as reducing our defense manpower requirements.

COMBAT SUPPORT

The Combat Support mission area includes those systems designed to provide operational support to the soldiers in the combat area. Included in this mission area are engineer support to include mine and countermine operations, support of combat operations in a nuclear and chemical environment, the conduct of electronic warfare operations, and the provision of tactical intelligence to support combat operations.

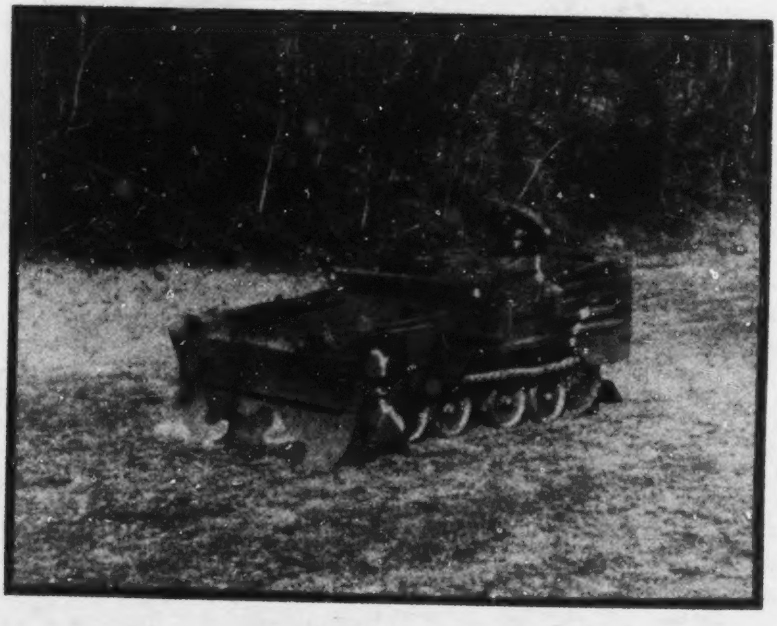
We are well-acquainted with the Soviet use of massed armor and the formidable threat it poses to our forces. Minefields, obstacles, and protective barriers are several means of making the enemy's job difficult. Mines can destroy the tanks spearheading an attack and cause disruption and delay in the enemy's advance, or deny him access to planned avenues of approach. If the enemy commander decides to halt and clear a path through the minefield, he must compress his formation and expose himself to our concentrated antitank and artillery fires. If he attempts to run through the minefield, he will pay a heavy price in tanks. Finally, avoiding the minefield costs him time and may well force him to maneuver his force into our preselected kill zone or into disadvantageous terrain.

On a fluid, rapidly changing battlefield, it is imperative that minefields be emplaced expeditiously. In the past, the emplacement of mines was a slow and laborious process, and mines had to be emplaced long before the enemy commander



Ground-Employed Mine Scattering System had declared his intentions. The new family of scatterable mines changes this situation. The Ground-Emplaced Mine Scattering System (GEMSS) will enable us to lay large minefields in a comparatively short timespan. GEMSS, a trailer-mounted system with a capacity of 800 mines, dispenses at a preselected rate to provide the minefield density required. This capability can be best appreciated by comparing the system with the older mines and dispensers in our inventory. Using the older systems, it would take 50 hours to lay a 2500-meter antitank minefield and require 46 5-ton truckloads of mines. GEMSS can lay a more effective minefield in 3 hours and requires only three 5-ton truckloads of mines to do it. The GEMSS mines weigh 4 pounds each and are as capable of destroying a tank as the old 30-pound blast mines that are still in the inventory. GEMSS is now in production, and the FY84 budget request will provide for procurement of 12,000 antipersonnal and 55,000 antitank mines.

Another key element in the defense is the positioning of our weapons systems in defilade which, in conjunction with the use of obstacles such as minefields and tank ditches, greatly increases the combat effectiveness of our forces. Obstacles slow and channel the enemy attack so that his tanks and combat vehicles are more vulnerable to our fire.



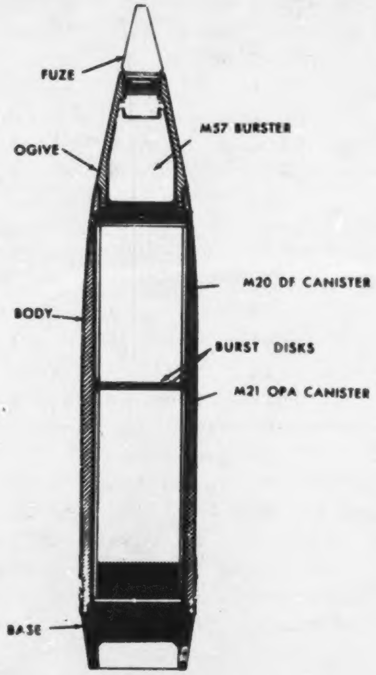
Armored Combat Earthmover

Positioning our weapons in defilade reduces the probability of identification of friendly systems as targets by an attacking enemy ground force and compounds the difficulty of an enemy in engaging and killing a defending system.

The Army needs the capability to prepare fighting positions and create obstacles when and where needed on the battlefield. The M9 Armored Combat Earthmover is uniquely designed for these functions and to help ensure the mobility of our force over all terrain conditions. The M9 has the speed and mobility to keep pace with the combat force, armor and chemical agent protection to survive, and the capability to provide the essential frontline heavy digging support.

Chemical warfare may very well be the Army's most vulnerable area in the 1980's. Even though the US is formally committed to the policy of "no first use" of lethal or incapacitating chemical agents by adherence to the Geneva Protocol of 1925, and seeks a complete and verifiable ban of lethal chemical weapons, the threat still exists. Today, US forces are facing a chemical threat from an adversary that is the best prepared and trained nation in the world in the use of chemical warfare. Without question, the Soviet Union possesses a formidable offensive capability to wage chemical warfare for an extended period, and their leadership continues to devote significant resources to research, development, and procurement of more advanced chemical weapons and equipment. They also have a large and well-equipped, dedicated chemical force, and all units within their armies train extensively for chemical warfare, including the use of live agents in training.

Given the disparity between US and Soviet chemical warfare capabilities and evidence of Soviet use of chemical warfare directly or through surrogates, we must promptly modernize our own retaliatory capability. The US currently has a limited stockpile of chemical munitions. All of these munitions are of the unitary design; that is, they contain the actual agent in its final form. These munitions are also aging--some date back to World War II--are costly to store, maintain in a usable status, and transport in a safe manner. Additionally, the stockpile is composed of weapons and agents that are inadequate. The best option for developing and insuring a credible retaliatory stockpile in support of the national policy of deterrence is binary modernization. The binary concept uses two nonlethal chemical components that combine during the flight to the target to form a lethal chemical nerve agent. In addition to the added safety afforded by binary munitions during production, storage, and movement, binary modernization would allow the optimum weapon and agent mix. Accordingly, an intensive R&D effort is underway to improve binary technology for application to rocket and missile warheads.



[redacted] M687 155mm GB2 Binary Projectile

The Congress, recognizing the need to modernize the chemical weapons stockpile, appropriated $23.15 million in FY81 for construction and facilitization of the Integrated Binary Production Facility at Pine Bluff Arsenal, Arkansas, for production of the 155mm GB-2 (nonpersistent) artillery round. Initial construction began in October 1981, and completion is expected in August 1984. Congress deleted FY83 funding for procurement of the 155mm GB-2 without prejudice, therefore FY84 funds are now required. Research continues on improved agents with an objective of developing a binary chemical warhead for the Multiple Launch Rocket System.

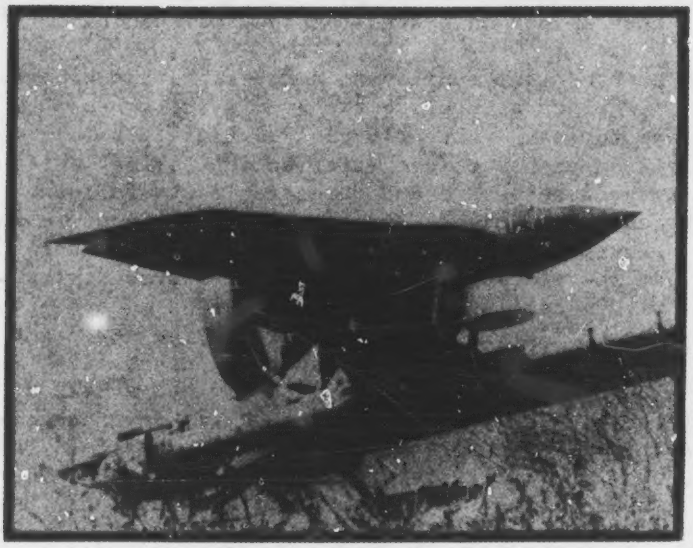
At the same time, we must continue the procurement of chemical protective equipment in FY84 to improve the ability of our forces to survive an initial chemical attack. More procurement, research, and development are required before we can sustain combat operations in a chemically contaminated environment. Additional quantities of the fielded protective masks will be procured to provide adequate individual respiratory protection for each soldier. Also, collective protection systems are being integrated into our command, control, and communications systems and combat vehicles.

The FY84 chemical program expands our efforts with academe and industry to broaden the technology base required to support materiel needs. Development will continue on a new protective mask, and numerous items of collective protection equipment for shelters, vans, and tactical armored vehicles. In the chemical agent detection and alarms area, development will continue on a remote sensing alarm, an automatic chemical agent detector alarm, and an automatic liquid agent alarm. Work will also continue on decontamination systems for clothing and a rapid decontamination system for tactical vehicles.

As with our chemical munitions, a modernization program is underway to replace or upgrade the Army's short-range theater nuclear forces. Currently fielded Army systems, with the exception of Lance, are experiencing serious declines in reliability because of age and attendant parts failure, and are deficient in terms of operational utility and command, control, and security features. High-priority systems are being replaced; lower priority systems will be product-improved. On track and within cost and time schedules is a modern eight-inch nuclear projectile procurement program. The new eight-inch warhead, which has an enhanced radiation capability, is replacing the currently fielded, mid-1950's-vintage M422 nuclear projectile. The Army is also procuring an enhanced radiation-capable warhead for the Lance missile system. These enhanced warheads are being stockpiled on US territory in accordance with President Reagan's production decision. The most important Army short-range nuclear program is the improved 155mm nuclear projectile, which is in development. A modern 155mm nuclear projectile is urgently needed to provide a survivable, effective cannon artillery capability for US and NATO forces.

Historically, a ground commander's greatest shortcoming has been the lack of information concerning the enemy's location, disposition, and intentions. In past conflicts, we have relied upon a number of ways to obtain information about the enemy. The most reliable sources were usually agents planted behind the lines or reconnaissance patrols that penetrated enemy lines at great personal risk. Often, when these sources obtained information, they were unable to communicate it to their superiors. Thus, the high personal risks that they assumed had no payoff.

With the introduction of the Remotely Piloted Vehicle (RPV), a relatively small, propeller-driven, remotely controlled aircraft, we have the potential to remedy this shortcoming. The Remotely Piloted Vehicle has the capability to fulfill several important battlefield functions. It is designed to fly into hostile territory and locate targets, adjust artillery fire, and laser-designate targets for destruction by laser-homing artillery or missiles. It can also perform reconnaissance, damage assessment, and other functions. The RPV carries a small television camera and a laser designator. In its later version, a Forward Looking Infrared (FLIR) night vision sensor will be added.



Remotely Piloted Vehicle

Reconnaissance will be another high-priority function of the RPV. The RPV can fly above a key enemy zone in order to gain required data when the defensive strength of the enemy is likely to make manned reconnaissance extremely risky. Small RPV's, which are difficult to track and hit, will enable us to fly reconnaissance missions without risking pilots or valuable aircraft. RPV flight testing started in July 1982, and twelve successful flights have been flown. Launch, recovery, navigation, and telemetry of TV video were demonstrated. FY84 funds will support continuation of flight tests, and conduct development of the FLIR night vision sensor.

Interdiction is a key to battlefield success. The enemy's momentum can be diminished by attacking high-value second-echelon targets, thereby reducing his ability to mass and build up momentum. To accomplish the interdiction mission, a combination of mutually dependent sensor and computer-based tactical systems provides the tactical commander the ability to detect targets and rapidly disseminate surveillance and target attack data. The Remotely Monitored Battlefield Sensor System (REMBASS) is one of these systems. It is a combination of seismic, acoustic, magnetic, and infrared sensors that are presently hand-emplaced and remotely monitored. The sensors classify and detect movement of personnel and wheeled and tracked vehicles. Reporting information is automatically provided to the supported unit's operations center to assist in fire and maneuver decisions. REMBASS' burst transmission technique, below-ground sensor emplacement, and passive operation make it extremely hard to detect.

REMBASS provides the tactical commander with an urgently needed all-weather, terrain-independent system for forward area operations, and a rear area intrusion detection and target development capability. It is a light, easily deployed, maintainable system that is well suited for contingency forces faced with wide frontages, extensive depths, and gaps between adjacent units. With the use of relays/repeaters for ground applications, REMBASS is designed to provide target data at 100 kilometers range, and thereby partially fill the "see-deep" requirement of the Air-Land Battle. The hand-emplaced sensors are funded for FY84 procurement. Air-delivered sensors are projected for joint Army/Marine Corps development beginning in FY85. Initial operational capability is projected for second quarter FY86.

The Joint Surveillance and Target Attack Radar System (JOINT STARS) will provide a Moving Target Indicator/Weapons Guidance, aircraft-mounted radar capability to detect and locate moving ground targets, command posts, assembly areas, and low-flying helicopters or fixed-wing aircraft. Its operational effectiveness will be enhanced by cueing from other sensors, such as REMBASS. Simultaneous broadcasts, made to multiple ground stations at division and corps, and integrated within the All-Source Analysis Center (ASAC), will provide both battlefield management and quick-reaction targeting information. The field artillery can then receive targeting data through TACFIRE.

The JOINT STARS program results from a merger of the Army's Battlefield Data System (BDS) program and the PAVE MOVER program of the Air Force. Under the JOINT STARS program, we are continuing to pursue an affordable way to provide a battle management and moving target information capability to our field commanders. Additionally, the JOINT STARS program will provide a weapons guidance capability for both the Army and Air Force. This overall JOINT STARS multimode capability is urgently needed to win the Air-Land Battle.

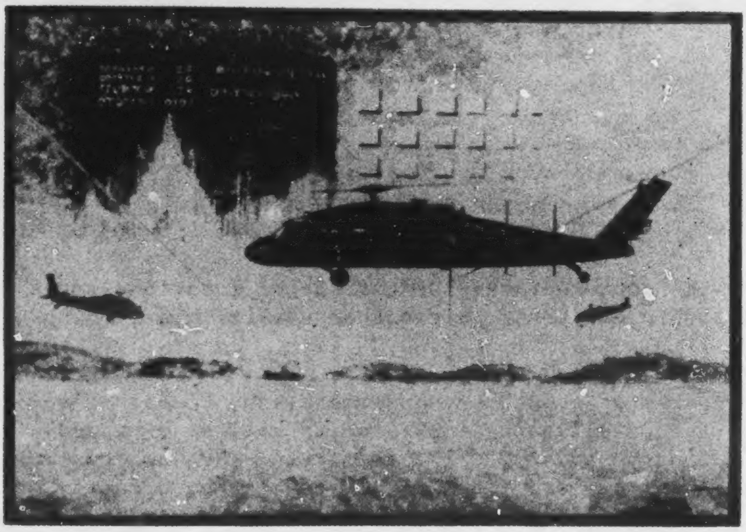
Offensive electronic warfare operations are calculated to disrupt enemy command, control, and communications capabilities. This is an area where the Soviets may be vulnerable because of their rigid hierarchical structure. In this system, the Soviet soldier depends almost exclusively on orders before acting. This lack of individual resourcefulness may well prove the Achilles' heel of the Soviet Army if we can impede the orders which flow from Soviet command headquarters. Every unit is tied by an electronic apron string to its next higher echelon. Disrupting the Soviets' communications network by means of electronic warfare may be a key means of slowing a Warsaw Pact attack, thereby making it vulnerable to eventual defeat.

Guardrail

Before a commander can employ electronic countermeasures, he must understand the enemy's use of electronic systems. He must see these systems as a target array and understand the relative importance of each enemy net or weapon system using electronic emitters. Programs to enhance a commander's capability to obtain this type of information are extensive and varied. Items such as the Teampack and Trailblazer are ground-based radar and communications intercept systems which are currently being fielded. Others, such as the Guardrail and Quick Look, are airborne signals intercept systems which, though fielded, are being upgraded through product improvements.

Guardrail V is a combined airborne sensor and ground processing facility communication intelligence system with proven ability to provide near-realtime data on the location of enemy electronic emitters. The airborne sensor is carried in the RU-21H aircraft. Guardrail, in the RU-21H platform, has some limitations such as an unpressurized aircraft and limited frequency coverage. Thus, we are continuing the procurement of the Improved Guardrail (RC-12D), a system that overcomes those limitations.

Quick Fix is an airborne offensive communications intercept and jamming system that will deny the enemy the use of his radios during key periods of battle.



Quick Fix

The Quick Fix System is capable of intercepting and jamming enemy communications. Quick Fix is designed to operate against air defense units and maneuver units. Quick Fix I is currently flown on a modified EH-1H aircraft. Future Quick Fix II systems will be mounted in the EH-60A Black Hawk aircraft.

Quick Look II is an airborne, computer-controlled system mounted on a Mohawk aircraft that detects, locates, and identifies enemy radars. It provides tactical field commanders with timely data on enemy missiles, artillery, and antiaircraft weapons. The FY84 budget contains funds for product improvements to the aircraft and mission systems.

UNITED STATES ARMY

Quick Look

After the commander has identified the locations of enemy electronic emitters, he can then utilize his jamming assets.

In the area of ground-based jammers, our Combat Electronic Warfare Intelligence (CEWI) units will be equipped with the medium-power AN/TLQ-17A jammer and the high-power AN/MLQ-34 TACJAM jammer. The Army is developing a family of low-power, expendable jammers that are designed for hand and remotely piloted vehicle emplacement, or delivery by artillery projectiles. Procurement of the hand-emplaced jammers begins in FY84. Additionally, the Army is equipping CEWI units with the VHF radio electronic countermeasures set, AN/VLQ-4. This device allows us to use our AN/VRC-12 series tactical radio to jam the enemy and provides an ECM training capability to both the active and reserve forces. The FY84 budget will support the continued development and acquisition of electronic countermeasures capabilities for active units and forward deployed organizations.

COMBAT SERVICE SUPPORT

The Combat Service Support major mission area is an aggregation of mission areas related to providing staying power to the combat force and maintenance and support to the weapons systems, support systems, their operators and crews. In this section we will discuss both air and ground mobility systems including the Black Hawk helicopter, our largest cargo trucks, our commercially adapted utility vehicles, and finally our armored recovery vehicle.

In the initial stages of most potential conflicts, we can expect to fight outnumbered and outgunned. Therefore, the commander must have the ability to move forces rapidly about the battlefield in order to optimize their overall effectiveness and to avoid decisive engagements with forces having superior strength. The key to this capability is enhanced mobility, both air and ground, which enables us to position our forces in the right place at the right time.

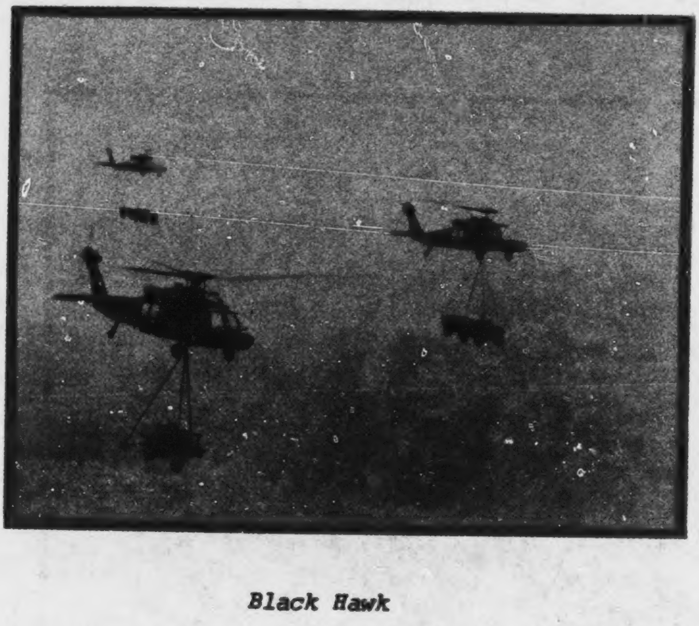
The Black Hawk helicopter, the high end of the high-low utility helicopter mix, will perform air assault, air cavalry, and aeromedical evacuation missions and answers the Army's need for improved battlefield mobility. Its predecessor, the UH-1, is an excellent and reliable helicopter, but is somewhat power-limited so that during hot weather and in

Black Hawk

high-altitude conditions, its payload is greatly reduced. Furthermore, in Vietnam we learned that we should reduce the vulnerability of future helicopters to small arms ground fire.

Black Hawk is clearly superior to the UH-1. It can carry more than twice the UH-1 payload and can transport a complete, fully equipped squad 42 knots faster in all weather and altitude conditions. Black Hawk also adds significantly to the mobility of division artillery. It is our first utility helicopter with sufficient capability to reposition a 105mm howitzer, its crew of six, and up to 30 rounds of ammunition in a single lift.

The critical components in the Black Hawk are either armored or redundant to enable it to withstand multiple small arms hits. It is invulnerable to the 7.62mm armor-piercing round, and tests have demonstrated its ability to continue flight for a minimum of 30 minutes after sustaining damage from projectiles as large as the 23mm high-explosive incendiary round. The airframe is designed to absorb impact forces by progressively deforming on impact, thereby protecting the crew in a crash.



Black Hawk

Black Hawk fielding for the 101st Airborne Division, the 82d Airborne Division, the 9th Infantry Division, and the 24th Mechanized Division is complete. Initial fielding for our units in Europe is in process with fielding to Korea beginning in late 1983.

The Black Hawk is presently being procured under an FY82-84 multiyear contract, which has significantly stabilized the production base and produced substantial savings to the government. This program has been so successful that the Army will propose a follow-on (FY85-87) multiyear procurement. The FY84 request funds the third and last year of the current multiyear contract. The program continues toward meeting the procurement objective of 1107 Black Hawks.

Another element of the Army's Combat Service Support mobility team is the CH-47 Chinook. This aircraft, the Army's only medium-lift helicopter, was designed in the 1950's and fielded in 1962. Its primary missions include the tactical movement of artillery, troops, and special weapons on the battlefield as well as the movement of ammunition, repair parts, and petroleum.

CH-47D

We intend to extend its useful life beyond the year 2000 by an extensive modernization program. The active Chinook fleet is being substantially upgraded. Modifications are all-encompassing, but the cost is significantly less than an all-new aircraft would have been.

The first production CH-47D was delivered to the Army in May 1982, 11 days ahead of schedule. FY84 is the second year of a proposed 3-year multiyear procurement and will procure 36 additional aircraft. This program has been accelerated to achieve a more economical production rate and will be stabilized at a rate of 60 aircraft per year beginning in 1986. This acceleration will cause the procurement to be completed four years earlier than we had originally planned and will reduce overall program cost.

While helicopters are essential to rapid mobility and resupply of the Army, tactical wheeled vehicles have been and will remain the backbone of our logistical system. The Army's tactical and support vehicle fleet is a vital element in maintaining force readiness. Today, as in the past, shortages of trucks exist throughout the force. The average age of our fleet and the fact that the vehicles are less capable than those we are currently procuring add to this problem. Furthermore, trucks are vital to the fielding of our new weapons systems such as the Pershing II, the Multiple Launch Rocket System, Patriot, and the SGT York. Trucks are essential to make these modern weapons work.

Heading the list of workhorses is the 5-Ton Truck. It supports the introduction of such major systems as the SGT York, Patriot, Pershing II, and TACFIRE, as well as meeting ammunition, general cargo transport, and other special-purpose needs. In FY81, a competitively awarded five-year multiyear contract was signed with AM General Corporation for 11,394 improved 5-Ton Trucks, with an option to increase production by 100%. In addition to meeting critical Army requirements and filling shortages, the contract also provides vehicles for the Marine Corps and Air Force. In FY84 we will continue to acquire vehicles under the contract signed in April 1981.

The Army 10-Ton Truck requirement is met by two vehicles. The 10-ton Heavy Expanded Mobility Tactical Truck (HEMTT) program features an assemblage of commercially proven components. A competitively awarded five-year multiyear contract was signed with Oshkosh Truck Corporation in FY81 for 2,140 HEMTT's, with an option to increase the quantities by up to 250%. The HEMTT meets high-priority systems requirements, such as Multiple Launch Rocket System and unit ammunition and fuel transport requirements. In FY84 we will continue to acquire vehicles under the contract that was signed in May 1981.

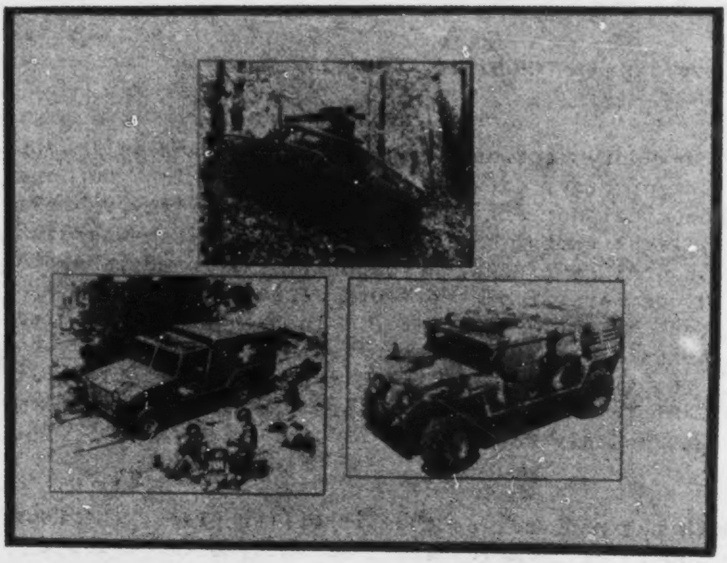
The other portion of the 10-Ton Truck requirement is met by the M.A.N. truck. The vehicle is being procured only to meet requirements for the Ground-Launched Cruise Missile (GLCM) and Pershing II (PII). The contract was awarded in October 1980. In FY84 additional vehicles will be acquired under the contract to support the fielding of GLCM and PII.

Heavy Expanded Mobility Tactical Truck

The heavy-duty tactical wheeled vehicles are well suited for transport of heavy cargo, fuel, and ammunition, but are neither economical nor efficient for use as utility vehicles or to carry light cargo. Such light-load requirements dictate the need for utility trucks. Presently, that need is satisfied by the M880, commercial pickup truck series of vehicles and to some extent by the M151 1/4-ton. In the future this light-load or 5/4-ton payload requirement will be met by two vehicle families. The first vehicle family is the Commercial Utility and Cargo Vehicle (CUCV), which serves the needs of the Army, Marine Corps, and Air Force.

As with the M880 series that it will replace, the CUCV will be a family of commercially available, off-the-shelf vehicles adapted to meet military needs. It will consist of cargo, utility, and ambulance versions and is a four-wheel-drive, diesel-powered vehicle in a nominal 5/4-ton payload category for use on primary and secondary roads. The CUCV will also have some cross-country capability. The competitively awarded CUCV contract with General Motors (signed July 1982) also complies with Congressional direction to commercialize at least 20 percent of the M151 1/4-ton fleet. The FY84 budget will support the third year of the 4-year multiyear procurement.

The other vehicle family in the 5/4-ton-payload category, is the High Mobility Multipurpose Wheeled Vehicle (HMMWV), which is complementary to the CUCV. The HMMWV is a nominal 5/4-ton-payload, diesel-powered, four-wheel-drive tactical vehicle that uses a common chassis with three body configurations: weapons carrier, utility, and ambulance. Emphasizing the use of commerically available components, the HMMWV will have excellent on- and off-road capability, with a range of 300 miles and a maximum speed of 60 miles per hour. This vehicle will replace aging and obsolescent vehicles in the light tactical fleet: the M561 GAMA GOAT, the M274 MULE, and, selectively, the M151 1/4-ton utility vehicle. It will also serve as a TOW and Stinger missile carrier and will perform in forward observer, forward air control, and other battlefield roles. This vehicle will be one of our most important assets as we move toward lighter divisions. The HMMWV program will also meet tri-Service needs providing vehicles for the Army, Marine Corps, and the Air Force.



High Mobility Multi-Purpose Wheeled Vehicle

In July 1981, development contracts were awarded on a competitive basis to three manufacturers for fabrication of HMMWV Vehicles: Teledyne Continental Motors, AM General Corporation, and General Dynamics Land Systems Division. Each contractor delivered 11 prototypes for development and operational testing in 1982. In FY83 we will complete the HMMWV research and development program and award a five-year multiyear contract for production of the vehicles that best meet the needs of the Services. FY84 is the second year of that contract.

We are pleased with the multiyear acquisition contracts awarded for the 5-ton, HEMTT, and CUCV and that proposed for the HMMWV vehicles program. We believe that they are or will be (in the case of the HMMWV) highly successful. One factor that contributes immeasurably to the attractiveness of these programs is the increased quantity that accrues when the Services pool their requirements, agree to commonality of the truck fleet, and take advantage of the commercial production base.

Accordingly, we are able to drive a better bargain with industry in a competitive environment and secure reasonable guarantees for quality, price, and schedule requirements. Such programs are attractive to industry because it can plan for several years of business rather than for one year at a time. These considerations foster private investment which enables higher productivity and a stronger industrial base. Our challenge for the future is to maintain the stability of our program funding to meet our existing,critical truck needs.

Rounding out our combat service support transport requirement is the M88A1 recovery vehicle. The M88A1 supports the mechanized and armored combat soldier by recovering disabled tanks and other combat vehicles from the battlefield. In the 1973 Mideast war, the Israeli Army demonstrated the importance of this capability by quickly recovering, repairing, and sending tanks back into the battle against a quantitatively superior enemy. This accomplishment was a key to the Israeli success.

Fielding of the M88A1 was initiated in 1977. A depot program to overhaul 863 gasoline-driven M88's and to convert them to diesel power was completed in FY82. The FY84 budget will fund the procurement of an additional 180 of these badly needed recovery vehicles.

Trucks and our other logistical support equipment give our soldiers the vital support they need to fight successfully in sustained conflicts, and merit your continued backing.

M88A1

Now that we have reviewed the mission areas that put combat power on the battlefield and sustain it in battle, we shall turn to the mission area that is essential for orderly execution of all battlefield missions--Command, Control, and Communications.

COMMAND, CONTROL, AND COMMUNICATIONS (C^3)

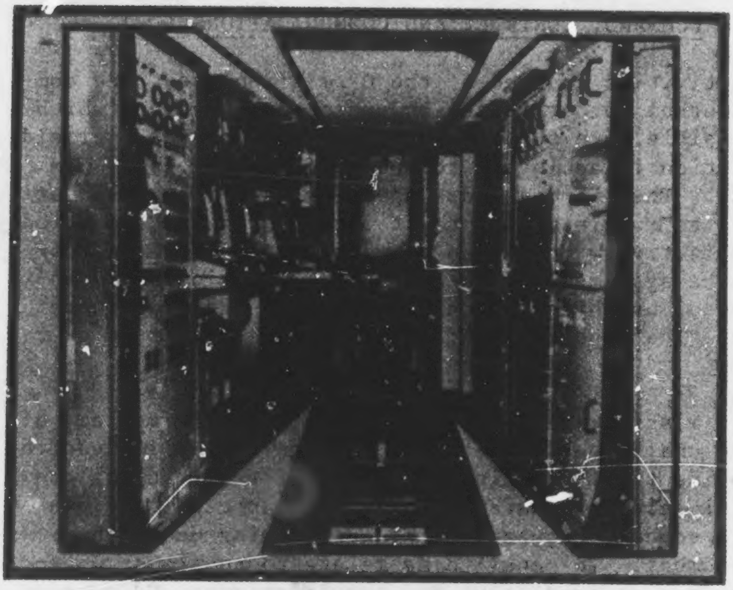
The activities covered by the C^3 mission area, the command and control of our forces and the communications which make it possible, are the keys to success on the battlefield. The C^3 function is analogous to the central nervous system of the body. The weapons and support systems discussed earlier are similar to muscles which react only on command and which function effectively only when they are controlled and coordinated. The systems discussed in the C^3 mission area provide the means by which we control, direct, and coordinate our forces. The importance of these systems cannot be overstated.

The C^3 mission area encompasses a staggering variety of demands and challenges. The demands range from a derivative of the Presidential "Hot Line," capable of transmitting the Presidential release orders to nuclear-capable units, down to a simple squad radio capable of functioning under the rigors of combat. The challenges relate to an almost unbelievable number of conditions and complications: C^3 systems are affected by natural and manmade phenomena, they are subject to enemy jamming and intercept, they must be compatible with fixed sites in peacetime and with mobile facilities during hostilities, and in many cases must be compatible and interoperable with our sister Services and NATO Allies.

Communications is a field in which the US possesses a degree of technological expertise that is the envy of the world; however, due to affordability constraints, the Army's fielded equipment did not keep pace with this technology during the 1970's. We plan to close this gap during the decade of the 1980's as we move from an era of grease pencils and manual switchboards to one in which the Army's entire C^3 network will be modernized.

The first system we would like to cover is the Joint Tactical Communications (TRI-TAC) program, a Joint Service and DOD Agency program to develop and field future tactical multichannel switched communications. The broad goals of the TRI-TAC programs are to achieve interoperability between Army and other DOD telecommunications systems, provide new equipment that reflects the most recent technology, eliminate duplications in development among the Services, and enhance interoperability with NATO systems.

The TRI-TAC family of equipment consists of digital telephone and message switches, secure and nonsecure phones, subscriber terminals, multichannel radios, tactical facsimile equipment, and many other associated items. This equipment is urgently needed to replace the obsolete, nonsecure, manpower-intensive, and predominantly manual communications



TRI-TAC

equipment currently in the field. TRI-TAC equipment is designed to provide for an evolutionary transition from analog communications to modern and flexible digital communications. This will satisfy an urgent need since there is no digital switching capability in the Army's current tactical inventory of equipment. Equally important is the fact that TRI-TAC is designed to survive in a combat environment. It incorporates both nuclear hardening and jam-resistant techniques.

The Army is responsible for development of the TRI-TAC switches. We are now procuring the circuit and message switches which will be the heart of multichannel networks connecting telephones, message traffic, and data users in both secure and nonsecure modes. Initial deliveries of these switches will occur during this year.

The Army does not presently have a tactical radio system capable of operating in an electronic countermeasure environment. The Single Channel Ground and Airborne Radio System, SINCGARS, will give the soldier a jam-resistant, securable radio system capable of operating on the move and compatible with current vehicular radios and associated communications security equipment. The FY84 budget request accelerates the fielding of this urgently needed combat radio.

Any future conflict will require combat commanders to rapidly and precisely locate and identify their own forces, as well as other friendly units, on a highly mobile and extended battlefield. The Position Location Reporting System (PLRS), a joint program with the US Marine Corps, will give us that capability. It is cryptosecure, highly resistant to jamming, and can be used in all weather and terrain. In the future, PLRS will be integrated with the Joint Tactical Information Distribution System (JTIDS) Class 2 terminal to form the Army Data Distribution System (ADDS), or the PLRS/JTIDS Hybrid (PJH). As an enhancement of both programs, the ADDS will provide the Army with a reliable, jam-resistant, data communications, navigation, and identification system for use in the five primary functional areas which require C^3 on the battlefield: Maneuver Control, Fire Support, Air Defense, Electronic Warfare/Intelligence, and Combat Service Support. We consider attainment of this capability a high priority for successful combat operations. PLRS, therefore, in addition

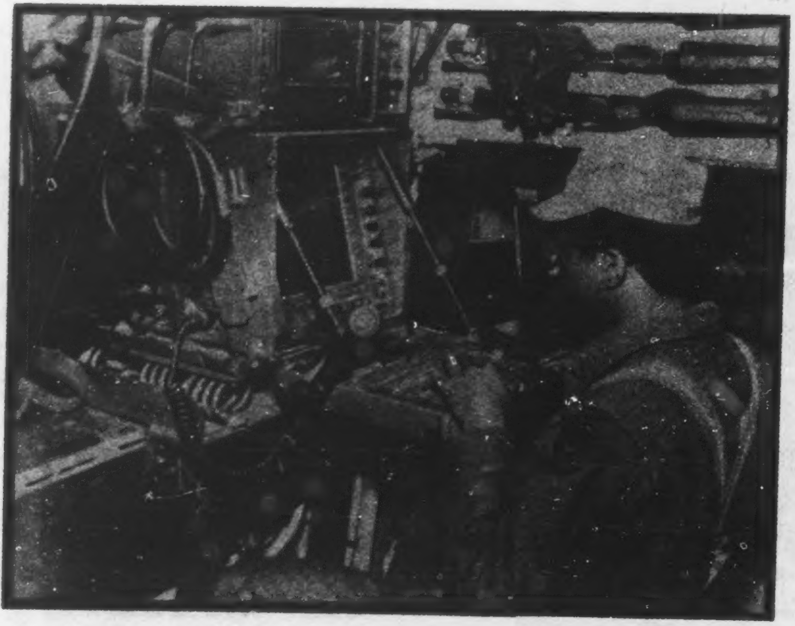
PLRS
PLRS
MANPACK
CONFIGURATION

Position Location Reporting System

to its own merits, requires prompt procurement to establish a base for the follow-on system.

In FY83 both the Army and Marine Corps approved PLRS for production, following acceleration and reprioritization of RDTE efforts. This realignment of RDTE tasks was in direct response to development issues raised by Congress last year when production funding was denied. Production contract award is now scheduled for early CY83.

A Maneuver Control System prototype was introduced into Europe in FY81 to gain experience in the development of an automated battlefield information system. Three Tactical Computer Systems (TCS) minicomputers and seventeen Tactical Computer Terminal (TCT) microprocessor systems were deployed and evaluated in field exercises. Key uses for the system by operations staffs were processing and distributing estimates, plans, orders, and reports. Evolutionary development of the system will continue in FY84, and FY84 will represent the second year of a three-year multiyear contract to be awarded in 1983.



Maneuver Control System

Tactical Satellite Communication (TACSATCOM) systems support the ground mobile forces of the Army, Air Force, Navy, and Marine Corps by providing reliable and effective communications between widely dispersed and rapidly moving forces. Each of the systems uses a communications satellite as a relay station between the terminals. Terrain is, therefore, less of a constraint for employment of TACSATCOM systems than for regular terrestrial systems.

Presently, two single-channel and one multichannel systems are being fielded. The single-channel system operates in the super high frequency range. Production of the single-channel Special Communications System, AN/MSC-64, will be completed in 1983. It will provide secure command and control communications from the National Command Authority to special weapons units worldwide. In addition, a two-year production contract has been awarded for a single-channel UHF manpack for use by Special Forces and Ranger Units. The Multichannel Initial System, AN/TCS-93 and AN/TCS-85, provides tactical satellite communications down to brigade level.

In the future, one single-channel and one multichannel system will be fielded. The Single Channel Objective Tactical Terminal (SCOTT), currently in advanced development, is an extremely high frequency (EHF) system which provides a jam-resistant satellite communication link. The Multichannel Objective System (MCOS), also a jam-resistant EHF system, is still in the concept validation stage.

The Defense Satellite Communications System (DSCS) is a worldwide military satellite communications system which supports Presidential communications, the National Command Authority, the Worldwide Military Command and Control System (WMCCS), the Diplomatic Telecommunications System, and tactical/strategic C^3I requirements of the Military Departments. The DSCS is also compatible with NATO military satellite communications systems as well as foreign and domestic commercial systems. DSCS provides the capability to satisfy RDJTF and RDF-A communications both within theater or strategically on a worldwide basis. It is the only capability in existence to satisfy critical wideband command, control, and intelligence communications.

DSCS is a Joint OSD program. The Air Force is responsible for the space segment and the Army is responsible for the ground subsystem. In the past few years, the Army has undertaken a complete upgrade and modernization effort that will result in the development, procurement, and worldwide installation of a new generation of large, medium, and transportable satellite terminals. These terminals will be equipped with digital communications and antijam equipment, and with a new automated system that will control the DSCS satellites in orbit as well as communications that pass through the satellite.

In support of the DSCS, the Army is currently engaged in the procurement of the AN/GSC-49 satellite terminals for the jam-resistant, secure communications program that will support the Tactical Warning and Tactical Assessment System, WMCCS, and The National Command Authority during enemy jamming or periods of highly volatile world conditions.

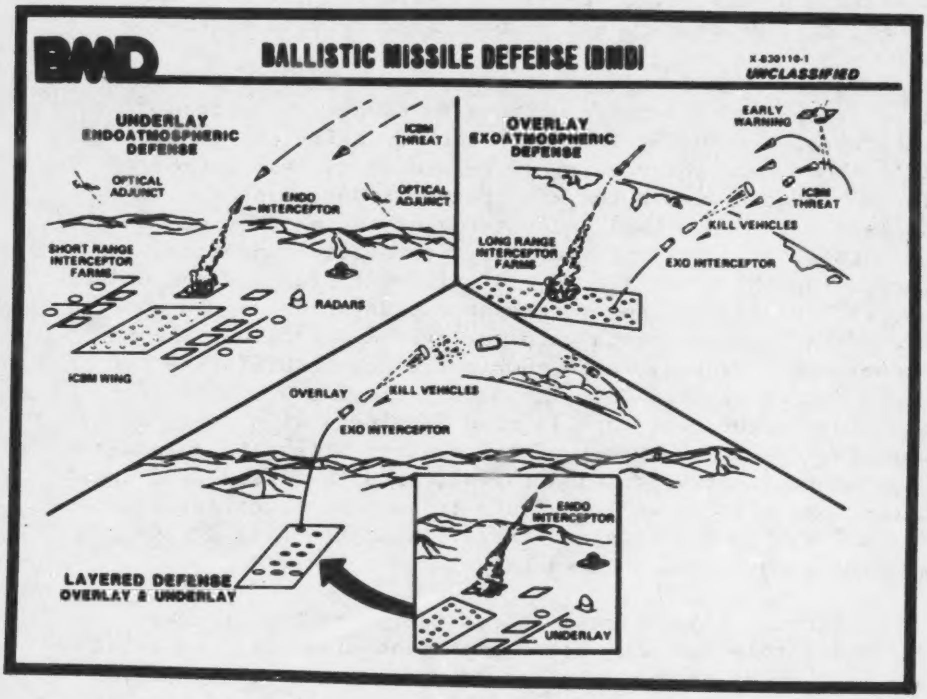
The NAVSTAR Global Positioning System (GPS) is a satellite-based radio navigation system that provides users with instantaneous data about position, velocity, and time. No other navigation or positioning system, present or programed, does this. When fully deployed, the system will consist of 18 satellites and thousands of user terminals.

GPS will be employed by units that normally operate at great distances from their home bases, such as cavalry, pathfinders, and Special Forces. It will also serve as an "initializer" for other position/navigation systems.

GPS is a joint program with the Air Force as lead and with Army, Navy, and NATO staffing in the Program Office. The Army is participating in the joint development of a family of manpack, vehicular, and aircraft user terminals. Testing of the first user terminals is scheduled to begin in 1983, and production in FY84.

BALLISTIC MISSILE DEFENSE

The US Ballistic Missile Defense (BMD) R&D program, the Army's only strategic weapon development effort, is currently undergoing significant change. The selection of BMD as one of the three options to be considered in future ICBM deployment decisions renewed emphasis on this vital program. Since the demise of SAFEGUARD, the US has not had a deployed BMD system, but a continuing R&D program has matured, promising new technologies and refined system concepts so that low-risk, technically advanced solutions are available for full development and deployment. The potential for highly effective defensive systems has never been greater. Evolutionary system concepts hold promise for the defense of a wide range of strategic targets in the face of unconstrained threat growth in both quantity and quality. Progress has been equally dramatic in expanding and advancing the technology base from which future BMD systems will evolve.


BMD
BALLISTIC MISSILE DEFENSE (BMD)
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UNCLASSIFIED
UNDERLAY
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OPTICAL ADJUNCT
ENDO INTERCEPTOR
OPTICAL ADJUNCT
SHORT RANGE INTERCEPTOR FARMS
RADARS
ICBM WING
OVERLAY
EXOATMOSPHERIC
DEFENSE
EARLY WARNING
ICBM THREAT
KILL VEHICLES
LONG RANGE INTERCEPTOR FARMS
EXO INTERCEPTOR
OVERLAY
KILL VEHICLES
EXO INTERCEPTOR
ENDO INTERCEPTOR
LAYERED DEFENSE
OVERLAY & UNDERLAY
UNDERLAY

Due to the President's recent decision not to deploy BMD for defense of PEACEKEEPER, the emphasis of the R&D program is being changed from near-term deployment to a broad based R&D program designed to develop the advanced technology and subsystems which will support greatly improved systems in the future. However, a hedge option will be retained for near-term deployment, if required.

Major program thrusts include development of advanced exoatmospheric and endoatmospheric defense concepts, to include an aircraft mounted optical sensor adjunct; endoatmospheric nonnuclear kill systems; continued efforts on terminal defense systems for ICBM defense; and the maintenance of options as a hedge against the requirement for rapid deployment. Advanced technology work, to expand the base from which new systems will evolve, will continue on a broad front, including research on space-based lasers and advanced sensors, data processing, and missiles.

System concepts being examined include both Underlay and Overlay defenses. A combination of the two into a Layered Defense provides a logical path for BMD.

During the past two years, a significant effort was devoted to the SENTRY D terminal defense effort, including the maintenance of a near-term deployment capability. The deemphasis on near-term deployment has resulted in a substantial cutback, e.g., the SENTRY effort. However, the radar, data processor, and some other work will continue.

The current Soviet force expansion points up the need to provide future defense options to counter a continued buildup of the Soviet threat in both quantity and quality. Kill mechanisms not requiring the use of nuclear warheads for employment within the atmosphere (Endoatmospheric Nonnuclear Kill--Endo NNK) and outside of the earth's atmosphere (Exoatmospheric NNK) provide very attractive approaches for increasing BMD capabilities. Significant programs are underway in both areas. An exoatmospheric defense program would provide a logical growth path for system expansion. An Exoatmospheric Overlay, when combined with a SENTRY-like terminal defense system Underlay, could provide a robust two-tier Layered Defense capable of defending a wide range of targets. As another part of the overall effort to maintain component effectiveness and build toward the future, advanced technology efforts will continue to support technical upgrades for all system concepts and investigate potential future systems such as space-based BMD.

Although ICBM defense is considered to be a primary potential role for BMD, other important missions also exist and are being addressed by the BMD program. For example, roles for the Layered Defense include protection of Strategic Air Command bases, critical communications nodes, the locations of key decisionmakers, and other high-value strategic targets. By pursuing both endoatmospheric (SENTRY, Endo NNK) and exoatmospheric defense concepts, the BMD program maintains the flexibility to provide defense options for many different applications. In addition to the defense missions, derivatives of BMD-developed technologies could have use in such varied applications as augmenting or reconstituting early warning and attack assessment sensors, and in potential antitactical missile systems.

To accomplish the mission, the BMD R&D effort is organized into two complementary program elements--the Advanced Technology Program (ATP) and the Systems Technology Program (STP). The ATP is designed to advance BMD-relevant technologies and to explore potentially revolutionary systems concepts. The STP integrates those technologies suitable for transition to systems applications into a systems context and validates the integrated technologies through high-fidelity simulation and testing.

The BMD Program Manager also is responsible for Kwajalein Missile Range (KMR) operations. The simultaneous use of KMR for both strategic offensive and defensive program testing provides a unique opportunity to collect realistic data vital to both efforts. The ability of the BMD program to observe and analyze developmental and operational firings allows cost savings in the tens of millions of dollars yearly. Kwajalein is the only range in the free world that can accommodate full-scale ICBM tests and provide sophisticated data collection for the terminal portion of the trajectory. KMR is a unique national resource, utilized by the Services, NASA, and other Government agencies.

The BMD program seeks a balance between two major objectives--that of maintaining cost-effective defense options which can be developed and deployed rapidly with low risk, and that of maturing advanced technology and system concepts which can become cost-effective counters to projected Soviet threat growth.

MEDICAL RESEARCH

Together with modern battlefield weapons systems, the soldier must be considered a "system" and, as the operator, is the most vulnerable and critical component in the array of battlefield systems. The Army Medical Research and Development Program is geared to address the factors that could make this system inoperable or cause it to operate at reduced efficiency due to physical, psychological, or disease-related stresses in a variety of climates and hostile environments, both in peacetime and during periods of hostilities.

Many of the normal, daily hazards to the soldier come from sources such as blast overpressure from artillery, combustion fumes from explosions, and radiation from laser, microwave, and radar systems. Army Medical Research addresses these environmental and occupational hazards.

Advances are also being made to aid the soldier in dealing with natural stresses. These include heat, cold, altitude, sleep deprivation, exhaustion, and the psychological strain of the battlefield. However, our personnel are more likely to become casualties from infectious diseases that have decimated military forces during past wars than from any manmade weapon system. We have made good progress in this area and many diseases can be prevented by vaccines or treated if a soldier is afflicted. In the tropical or remote parts of the world, there are deadly diseases for which we have neither cures nor means of prevention. Even malaria, for which many cures have been developed, keeps changing genetically in the face of antimalarial drug use in endemic areas. Diarrheal diseases, sand-fly fever, Rift Valley fever--to mention just a few--pose a threat to troops in areas such as the Mideast, even in the absence of combat. We are continuing to direct our efforts to cope with these problems and have made some progress.

During periods of hostilities, the soldier may be incapacitated or working at reduced efficiency due to the effects of chemical, nuclear, and biological weapons. Enemy use of nuclear, chemical, or biological warfare is a matter of conjecture, but it is an eventuality for which we must prepare. Therefore, to keep the soldier going, we are developing modern techniques for disease prevention, patient management, decontamination, and resuscitation in an NBC environment. For example, the US Army Medical Research Institute of Infectious Diseases has developed the capability to transport and handle patients having highly contagious diseases requiring stringent isolation precautions in order to prevent infections of the attending staff. Walter Reed Army Institute of Research has developed a new immunofluorescent antibody test for early diagnosis of cutaneous leishmaniasis so that timely treatment can begin before the disease manifests its more serious effects.

In addition, a new antidote against nerve agents, 2-PAM Chloride, which can be self-administered, has been developed and an industrial manufacturing base identified. Initial fielding of this new antidote has been accomplished to begin replacing the less effective TAB.

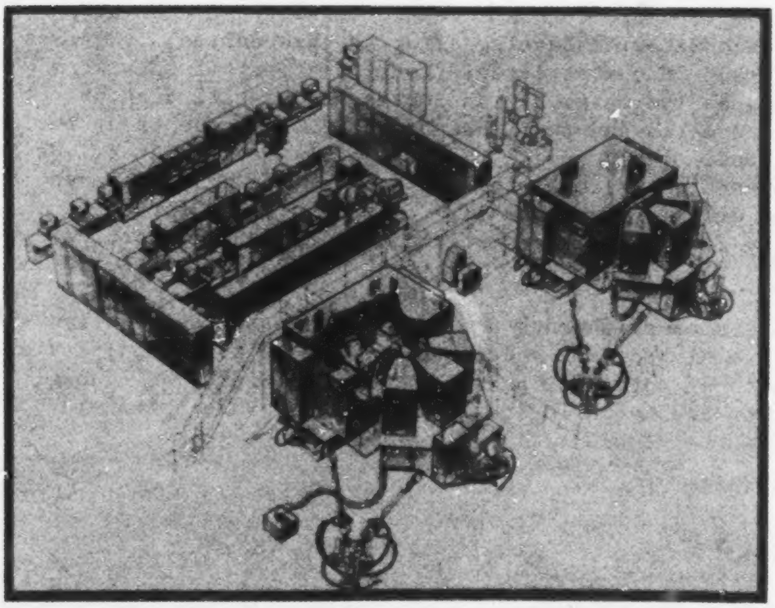
We are also expanding our efforts to develop medical equipment for operation in a chemical warfare environment. These efforts include the development of multipatient resuscitators for mass casualties, chemical hardening of medical supplies, chemical agent detectors/dosimeters, vital signs monitors, and a patient decontamination system.

In the more traditional areas, techniques are being improved and materiel developed for the prevention, diagnosis, and treatment of combat casualties. Treatment of burn wounds has been greatly improved with increased understanding of healing processes and functions of various components of the body tissues. (We can help the body heal itself better.) We are also seeking approval for the manufacture of a preservative that will increase the life of stored blood for up to 49 days in field situations where freezing is not practical.

These accomplishments are merely a few of the highlights of an extremely complex and broad research effort encompassing all aspects of potential hazards to the soldier, the crucial "system" on the technologically complex modern battlefield.

TRAINING SIMULATORS

The Army's investment in training simulators has been increasing steadily, and there are many important reasons for this trend. Simulators help to conserve fuel, ammunition and space needed for training, reduce wear and tear on weapons, and generally decrease training and operating costs. In addition to conserving scarce resources, there are safety and environmental benefits which accrue from the use of training simulators. Also important is the fact that very realistic training simulation can now be achieved because of advances in technology (e.g., in the use of microprocessors, computer-generated imagery, coded laser devices, and video-disc recordings).



Flight Simulator Complex

The scope of training simulators has broadened remarkably. They can now be used effectively for training repair technicians and logistics operations specialists as well as for weapons instruction and tactical indoctrination. Another noteworthy factor is that today's soldiers--who have grown up in an age of television and electronic games--respond enthusiastically to instruction with advanced simulators.

The Army's motivation in acquiring flight simulators is based on our desire to improve training effectiveness, maintain combat readiness, and cope with current and future operating costs. In addition to saving fuel and flight hours, flight simulators produce other benefits. These include: improved and more flexible training capability, extended airframe life, reduced aircraft accident exposure, reduced airspace and airfield requirements for training, and a large cost avoidance on ammunition. Flight simulators also offer training opportunities that are either not convenient or not possible in the air. For example, it is possible to observe the student's performance in a simulator, freeze a training event, tell him when his performance is unacceptable, demonstrate the correct procedure, and have the student repeat the task until competence is developed. This is an extremely important capability for training in those tasks that are dangerous or of significant risk. The student can experience malfunctions and learn to recover from emergency conditions that cannot be taught safely in actual flight. Other important advantages of flight simulators are that pilots can train regardless of weather conditions, crowded airspace, aircraft availability, and at a greatly reduced flying hour cost. With these benefits in mind, the Army plans on continuing to acquire and make optimum use, where applicable, of modern, high-fidelity, synthetic flight trainers to improve training effectiveness and decrease the high costs associated with training.

The first high-fidelity flight simulator developed by the Army, incorporating an out-the-window visual capability, was the CH-47C simulator. This cost effective training device completely replicates the aircraft and even enables the student pilot to practice sling load operations. In June 1982, the first production CH-47C simulator was available for training at Fort Campbell. Thereafter, additional simulators were fielded at Fort Hood and then in Germany. In FY84 the Army will buy a CH-47D simulator to be fielded in Korea. In FY85 the fielded CH-47C simulators will begin to undergo conversion to the "D model" configuration. These training devices will enhance the Army's CH-47D aviation training program.

Following the engineering development of the CH-47C simulator, the Army developed the AH-1 Cobra simulator, incorporating the advancements of the CH-47 simulator in terms of its motion, visual system, and more. The AH-1 simulator permits simulated firing of the TOW missile, 2.75-inch rocket, 7.62mm machinegun, 40mm grenade launcher, and the 20mm cannon. The simulator consists of two cockpits representing the pilot and copilot/gunner stations respectively, with each mounted on its own six-degree-freedom-of-motion system. Each cockpit is an authentic replica of the actual aircraft cockpit, and each has its own instructor station. The pilot and copilot/

gunner can be trained separately or as a team. The FY84 budget request includes funds for the procurement of one simulator.

In April 1980, the Army fielded the prototype UH-60 simulator for student training at Fort Rucker. The prototype consists of two identical cockpits. The visual system of one cockpit uses current-generation map board technology, while the second cockpit uses the more advanced technology of computer-generated imagery. An evaluation of both visual systems was completed in FY82 and the computer-generated imagery was chosen for the production model simulators. The Black Hawk simulator is primarily oriented toward training tactical flying skills. Additionally, the simulator may be used for training in confined area approaches and landings, sling loads, and formation flying skills. Completion of the development of this simulator is expected in FY83, and contract award for the first production models is expected in FY84. The first production model will be ready for pilot training in 1986.

In July 1982, engineering development began on the AH-64 Apache Combat Mission Simulator. This training device will replicate all systems of the Apache aircraft, to include the helmet-mounted display; an out-the-window visual system; copilot/gunner target acquisition device; and all the aircraft weapon systems to include Hellfire. The prototype simulator will be ready for student training in 1985. The device will be comprised of a pilot and copilot/gunner module, each with a motion system and instructor station. The pilot and copilot/gunner will likewise have the capability to train individually or train as a team performing a combat mission. The Army is continually advancing the state-of-the-art in flight training devices, seeking training equipment which replicates all aspects of flight, weapon systems, and the sound and fury of battle. The flight simulators the Army has developed train today's pilots better and at less cost then ever before.

In the armored vehicle area, procurement continues on training simulators for the Abrams Tank, and the Bradley Fighting Vehicles. The Unit Conduct of Fire Trainers (U-COFT) which are being procured in FY84 will provide battalion-level training for tank gunners and commanders on turret/gun controls, target acquisition, and engagement of targets. The long-term goal is to produce a large number of uniformly trained commanders and gunners.

Unit Conduct of Fire Trainers (U-COFT) are also being procured in FY84 to provide battalion-level training for Infantry and Cavalry Fighting Vehicle gunners and commanders on turret/gun controls and target acquisition and engagement.

R&D funds were used in FY83 to complete development of the Institutional Conduct of Fire Trainers (I-COFT) and turret maintenance trainers, leading to procurement of both starting in FY84.

In December 1981, Conduct of Fire Trainer prototype evaluations were completed at Fort Benning, GA, and Orlando, FL. The results of these tests indicated that soldiers who had never seen or operated an IFV could readily master firing skills after using the Conduct of Fire Trainer. When compared to a control group of soldiers who had had previous on-vehicle experience, gunnery proficiency scores were closely aligned, and minimal additional gunnery training was required.

The Signal Intelligence/Electronic Warfare Simulator (SIGINT/EW Simulator) is a communications network simulator used as a training and evaluation vehicle. The device will be able to generate a simulated threat electromagnatic environment tailored to the tactical mission of the using unit. It will provide 256 primary and associated background signals that include voice (e.g., Russian, Czech, Polish, German, North Korean, and 3rd World), Morse, teletype, and radar signals. The goal is to provide a capability to conduct intensive technical SIGINT training using tactical mission equipment driven by a digitally controlled system. The system simulates all aspects of the threat communication network in the context of a specific tactical scenario. This effort is an off-the-shelf buy and requires no developmental resources. FY83 funds are being used to fund an initial procurement contract. In FY84 we will continue procurement of this important system.

Training devices, such as the Multiple Integrated Laser Engagement System (MILES), improve the efficiency and overall effectiveness of training. MILES and the follow-on Air Ground Engagement System-Air Defense (AGES-AD) enhance realism and feedback to teach lessons heretofore only learned in actual combat.

Training technology, much of which employs videodiscs, computer-generated imagery or lasers, is a national strength that should be exploited to insure that American soldiers and their leaders can shoot, operate, maintain, and fight their new equipment as closely as possible to its maximum capabilities. MILES is fielded Army-wide. MILES for the M1, M2, and M3 will begin fielding in FY83, and AGES-AD in FY84.

Making provisions for training simulators has become an integral part of weapon system planning, and the resulting benefits promise us a more efficient, economical way to achieve high-quality training.

PROGRAMWIDE MANAGEMENT AND SUPPORT/RDTE MANAGEMENT

The US effort to maintain a lead in weapons system technology depends on sustaining a stable, high-quality research and development management and support capability. Adequate numbers and types of professional personnel must be available together with current state-of-the-art equipment and related logistical services. The synchronization of all Army R&D efforts with individual systems as they progress from basic research through development stages is vital in insuring success in Army acquisition programs. The dramatic changes in weapon system technology and sophistication carry with them a demand for a complementary adjustment of management resources and support.

An effective capability for testing developmental and production systems and those being product-improved is crucial to the fielding of technically superior, supportable, and survivable materiel systems. The Army must modernize its test instrumentation to insure that its test capabilities are commensurate with the systems to be tested, and that the test and evaluation function consumes the least possible resources in terms of time, manpower, and funds.

The Army must also update its laboratory equipment in order to maintain a state-of-the-art capability to support an R&D program that seeks to meet future needs. A phased replacement program is mandatory since most of our laboratory equipment was purchased just after World War II. We must also provide resources for other activities that are not related to specific R&D projects, such as common service support at RDTE-operated installations and headquarters. These resources are requested in the Programwide Activities program.

The FY84 budget request supports the manpower and related costs necessary to manage the Army's overall RDTE mission. We request your support of this less dramatic, but vitally important, portion of the FY84 budget request.

CONCLUSION

The FY84 budget request represents our best effort to provide a balanced program to equip the Army. It doesn't attempt to outproduce the Soviets, but it does strive to insure that our units have the equipment they are authorized, and that our soldiers are equipped with weapons and equipment that are as good as the Soviets'--and in many cases better than the Soviets'.

Thanks to our research and development efforts during the 1970's, we are ready to field the new weapons and equipment our soldiers need. However, in order for us to provide our Army with the capabilities that we have described, we need strong Congressional support.

With your help and the support of the people, we will provide our Army with what is needed in order for it to be ready should it be called upon to protect this nation's vital interests.

[Whereupon, at 12:10 p.m., the subcommittee adjourned, to reconvene at 9:30 a.m., Thursday, March 10, 1983.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1984

THURSDAY, MARCH 10, 1983

U.S. Senate,
Subcommittee on Tactical Warfare,
Committee on Armed Services,
Washington, D.C.

ARMY TACTICAL PROGRAMS

The subcommittee met in executive session, pursuant to adjournment, at 9:27 a.m., in room SR-222, Russell Senate Office Building, Senator Barry Goldwater (chairman) presiding.

Present: Senators Goldwater, Warner, Levin, Kennedy, and Bingaman.

Staff present: Carl M. Smith, professional staff member; James G. Roche, minority staff director; and Willis D. Smith, deputy staff director and chief scientist for the minority; Robert S. Dotson, George K. Johnson, Jr., José E. Martinez and James C. Smith, professional staff members; Marie Fabrizio Dickinson, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; Peter D. Lennon, assistant to Senator Levin; Matthew Murray, assistant to Senator Kennedy, and Ed McGaffigan, assistant to Senator Bingaman.

OPENING STATEMENT BY SENATOR BARRY GOLDWATER, CHAIRMAN

Senator **Goldwater**. The Senate is going in at 9:30 and we are going to have votes. It may be necessary for me to leave. In that case, the staff will continue the interrogation so that we won't keep anyone here longer than necessary.

We are reconvening this morning to wrap up the testimony of Army programs. We had some excellent presentations on Tuesday. I expect to finish with the Army witnesses today.

Dr. Sculley and General Merryman, we welcome you back. We will, as is our usual practice, ask the Army to respond to questions for the record since some subcommittee members are unable to be here. I would like to ask that all questions for the record on Army programs be submitted to staff by close of business today.

Gentlemen, you may proceed.

STATEMENT OF DR. JAY R. SCULLEY, ASSISTANT SECRETARY OF THE ARMY (RESEARCH, DEVELOPMENT AND ACQUISITION), ACCOMPANIED BY LT. GEN. JAMES H. MERRYMAN, USA, DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT AND ACQUISITION; BRIG. GEN. PHILLIP H. MASON, U.S. ARMY; MAJ. GEN. LOUIS C. WAGNER, JR., DIRECTOR OF REQUIREMENTS, OFFICE OF THE DEPUTY CHIEF OF STAFF, OPERATIONS AND PLANS; AND BRIG. GEN. DONALD S. PIHL, U.S. ARMY

General MERRYMAN. The first system we will cover today is the Army helicopter improvement program.

ARMY HELICOPTER IMPROVEMENT PROGRAM (AHIP)

Fiscal year 1984 RDT&E request, $53.7 million.
Fiscal year 1984 weapons system procurement request, $191.2 million.
Day/night, adverse weather scout.
Uses existing OH-58A airframes.
Compatible with Apache and Cobra attack helicopters.
Field artillery observation and laser designation.
16 in fiscal year 1984 request, 578 total buy.
Fiscal year 1984—1st year of production.

You will recall that the purpose of this program is to provide a scout helicopter which will work with our attack helicopters and also direct artillery fire.

It uses an existing airframe, sir. If you remember, we have somewhat less than 2,000 OH-58's that were built by Bell Helicopter in the inventory. We are going to modify 578 of these to this configuration. There are two significant breakthroughs with this helicopter. You notice we take the OH-58 that you are familiar with and put four rotor blades on it, above those we put a mast mounted sight. With that sight you will have a television capability, magnified opitics, and you have a laser designation capability.

The third major change to the bird is the new engine, the Detroit Diesel Allison C-30R, the same one that Sikorsky uses in their S-76.

Senator GOLDWATER. That mast mounted sight does not rotate?

General MERRYMAN. No, sir, the support structure is fixed to a nonrotating structure. It does not rotate with the rotor. However, the ball and optics are movable in elevation and azimuth.

Senator GOLDWATER. Can the pilots move it?

General MERRYMAN. He looks through a TV monitor in the cockpit. He has to change the sight direction. He controls the movement and optics in the direction he wants. The sight support structure itself is fixed.

Senator GOLDWATER. Is the sight coordinated with the weapons?

General MERRYMAN. There is no weapon on this bird, sir. This is a scout. Now one thing we are looking at, Senator Goldwater, is the possibility of putting an air-to-air self-defense weapon system on this aircraft sometime in the future.

The reason we are doing that is because, as I mentioned the other day, the Soviets continue to build so many new attack helicopters. We have seen evidence in our intelligence reports that they are practicing with air-to-air systems.

We have tried not to put an air-to-air capability on our birds to save money up to this point, but this year we will have some dollars in our R&D budget to start looking at the potential application of the Stinger missile to be mounted on this aircraft.

Senator **Goldwater**. I think you are making a terrible mistake not to put a weapon on it.

General **Merryman**. All the intelligence estimates support what you say.

Senator **Goldwater**. What does that object do to the stability of the aircraft?

MAST-MOUNTED SIGHT

General **Merryman**. It has no major effect on the stability. If you remember, we have flown the mast-mounted sight on the OH-58 and the mast-mounted sight on the Hughes 500D over the last 3 or 4 years. We have found there is no problem with the stability.

Senator **Goldwater**. I can't see aerodynamically why that sight should give you any stability problems.

I was wondering if there was any effect on stability. I can't see where there would be.

General **Merryman**. No, sir. I personally have flown the two birds, the Bell bird and the Hughes bird. They have had them on those aircraft for 3 or 4 years. As a matter of fact, to make sure that there are no instability problems created by this configuration, we will have tests this year where we will fly with a dummy sight—we won't have the functional sight until late this year—just to make sure.

So, when you see the final picture, when the aircraft design is finalized, that sight might look slightly different than it is right now, But we have no indication that that is going to be a problem at all.

The sight affords you an opportunity to keep that aircraft down in the trees so that the only thing that is above the trees is just that little ball. The other thing that little ball does is that it helps you to see way out in the distance, something you can't do today.

For example, we estimate you can see today about 1.5 kilometers with the eye. That sight will let you see [deleted]. In addition to recognizing targets, it will also laser designate up to [deleted].

This is what we are doing in 1982 and 1983.

AHIP Highlights

Fiscal year 1982 accomplishments: Full scale development—fixed price incentive contract; preliminary design review—March 1982; OSD approval—14 April 1982; engineering support testing of "brassboard" hardware.

Fiscal year 1983 status/plans: Critical design review—November 1982; contractor development testing; complete engine FAA certification; long leadtime item release—June 1983; first flight with dummy mast mounted sight—August 1983.

Senator **Goldwater**. Do you have any technical paper that describes that sight?

General **Merryman**. Yes, sir.

Senator **Goldwater**. Could you send me one?

General **Merryman**. I certainly will.

In 1982 we essentially finished our full-scale design, we have gone on contract. We got DOD permission to proceed last April. This fiscal year we finished up our Critical Design Review, we will get our engine certified in a couple months. We will also release our long leadtime items and have the first flight with the dummy mast-mounted sight in August.

AHIP FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY84 $)

DEV EST FY82	3.25
FY83	3.25
FY84	3.43

COST GROWTH

FY83-84	5.5%
TOTAL	5.5%

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	71.6	73.8	53.7	24.3	0	223.4
WPN SYS PROC	0	28.4	191.2	245.0	1856.7	2321.3
QUANTITY BUY	0	LLTI*	16	44	518	578

*LLTI–LONG-LEAD TIME ITEMS

$(000,000)

This chart shows you the cost history of this system. It is a new one, so we don't have much to tell you. The 5.4 percent increase is due to the requirement for some additional spares, initial spares. That is all we have on this one at this time.

LIGHT ANTITANK WEAPON

Fiscal year 1984 RDT&E request, none.
Fiscal year 1984 weapons system procurement request, none.
Soldier's lightweight antiarmor weapon.
Proliferable throughout the battlefield.
41,400 rounds procured through fiscal year 1983 FDP.
Fiscal year 1983—joint Army/Marine Corps evaluation.

VIPER

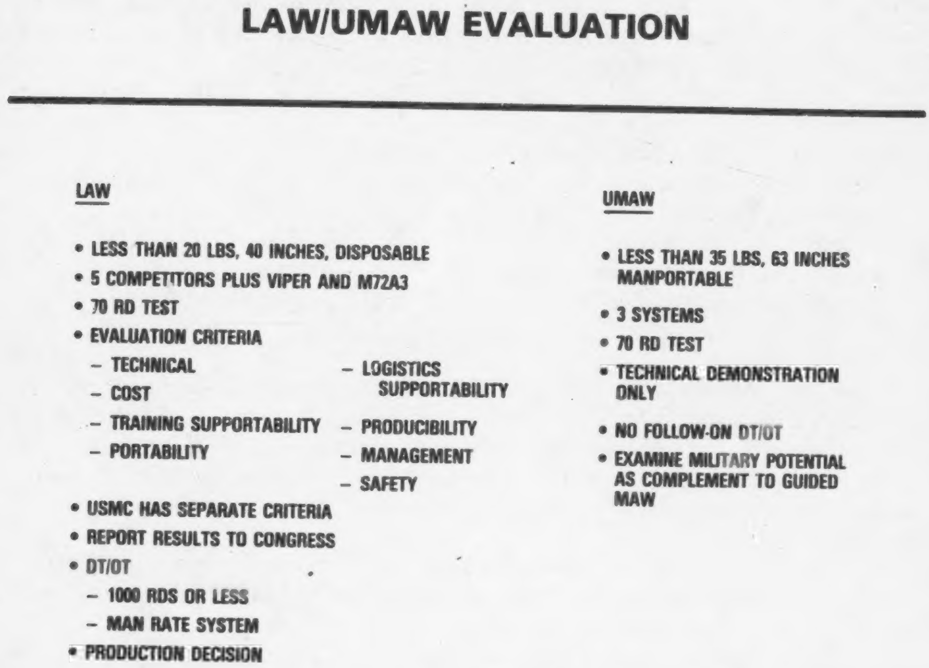
Sir, on this one I am not asking for any money. You notice there is none in R&D and none in procurement, but we need to tell you what is going on with this program.

Up until this year the heading on the charts said Viper, which you probably remember. Viper was the system that the Army was trying to procure to replace the LAW or the light antitank weapon.

We have had some problems with Viper, as I am sure you know, in costing and also in performance. As a result of the problems, last year the Congress took the money out of the program and directed that the Army to conduct an evaluation of systems that could compete for the Army's light antitank weapon system.

LIGHT ANTITANK WEAPON COMPETITION

I will tell you now about that competition.



LAW/UMAW EVALUATION

LAW

- LESS THAN 20 LBS, 40 INCHES, DISPOSABLE
- 5 COMPETITORS PLUS VIPER AND M72A3
- 70 RD TEST
- EVALUATION CRITERIA
  - TECHNICAL
  - COST
  - TRAINING SUPPORTABILITY
  - PORTABILITY
  - LOGISTICS SUPPORTABILITY
  - PRODUCIBILITY
  - MANAGEMENT
  - SAFETY
- USMC HAS SEPARATE CRITERIA
- REPORT RESULTS TO CONGRESS
- DT/OT
  - 1000 RDS OR LESS
  - MAN RATE SYSTEM
- PRODUCTION DECISION

UMAW

- LESS THAN 35 LBS, 63 INCHES MANPORTABLE
- 3 SYSTEMS
- 70 RD TEST
- TECHNICAL DEMONSTRATION ONLY
- NO FOLLOW-ON DT/OT
- EXAMINE MILITARY POTENTIAL AS COMPLEMENT TO GUIDED MAW

This chart shows you what the competition is going to consist of. We have LAW, which stands for light antitank weapon, and UMAW which stands for unguided medium antitank weapon system.

On the left is what Congress directed us to do, to look at all the potential competitors, and I will show you who those are in a moment, that may meet the Army's requirement for a light system.

There are five competitors in the 70-round test plus Viper and the M72A3. This section shows you the criteria in determining who wins. We will come back and report the results to the Congress by the end of September.

If a system other than Viper wins, we will have to conduct a series of developmental and operational tests (DT/OT) next year. I will tell you more about it in a moment.

For UMAW's we are running an additional side test or evaluation because there are many things out there that are slightly larger than the LAW category, that may have some potential for the Army or the Marine Corps.

The UMAW weight limit is 35 pounds, but you can see for the LAW category it is 20. The difference between the two is that something less than 20 lbs can be carried by each infantryman in the squad and that is important because that is what we feel we must have.

Something as large as 35 lbs could not be carried by a soldier who is already out there with his own individual weapon. It would require a dedicated gunner or a man whose primary mission is to fire this system. That is why we are primarily interested in what I am showing you on the left of the chart, but we are also looking at what is on the right side.

Senator GOLDWATER. Is this new one going to be armorpiercing?

General MERRYMAN. Yes, sir.

Senator GOLDWATER. How much armor?

General MERRYMAN. We don't know, sir. They all vary slightly.

Here are the systems we are looking at in the lightweight category. This is the Norwegian LAW, the Swedish candidate, the German candidate. These are the UMAW candidates.

To answer your question, each one is slightly different.

Senator GOLDWATER. To put it a simpler way, what will it do to Soviet armor head on?

General MERRYMAN. That is one of the reasons we are running the test. But I need to point out to you, sir, that as far as the Army is concerned, we do not believe it is necessary to penetrate that tank head-on if it means you must have a weapon system so heavy that a man couldn't carry it with his own individual weapon system.

If you look at combat in the past wars, you will find over 60 percent of the shots are side shots or flank shots. You have to remember that you have all kinds of weapons out in front of you. You have TOW's, you have Hellfires, you have tank guns. What we are talking about here is a system that will give some capability to that young infantryman when everything else has failed and he finds himself face to face with some armor out there.

ANTITANK TACTICS

So, what we need is to find something that will penetrate as much as it can, but that is light enough so that the young man can carry it with all the other stuff he has to carry.

Senator GOLDWATER. You say it will immobilize a tank, but isn't a track a rather small target for that kind of weapon?

General MERRYMAN. The only time you would find this kind of weapon employed would be very close in. Like the Viper which was 300 meters. So you are talking about close-range shots.

General WAGNER. Sir, as with the Viper or any of these light weapons we do not teach the individual soldiers to tactically take the tank head-on because a man in a field jacket or OD shirt out there facing a tank has a difficult problem.

We teach them to hide, pop up, and shoot. Viper will penetrate side armor, go into the turret and get a catastrophic kill. Any of these will.

As far as going through the front armor, we have never asked for that. It would have to be so big, our soldiers couldn't carry it.

Senator GOLDWATER. What is the average thickness of the frontal armor of Soviet tanks?

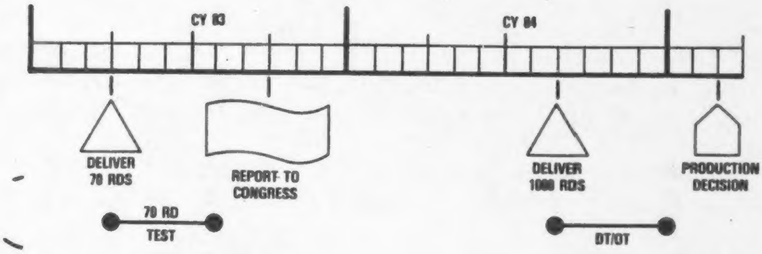
General MERRYMAN. [Deleted.]

That is the worst case for frontal armor.

If you talk terms of what is out there now, the Viper can [deleted] the tanks that are on the current battlefield.

I don't want to mislead you. Viper will [deleted]. The only ones it will not penetrate are the frontal armor of [deleted].

LAW/UMAW EVALUATION



LAW CANDIDATES

- M72-750 – IMPROVED NORWEGIAN LAW
- AT-4 – SWEDEN
- ARMBRUST – FRG
- LAW 80 – UK
- VIPER VARIANT – US
- ALSO – M72A3 & VIPER

UMAW CANDIDATES

- APILAS
- STRIM
- PANZERFAUST III

This chart shows you the schedule for the test. We start in April and finish in July with a 70-round test. As I mentioned earlier, if something else wins other than Viper, which has already gone through DT/OT, we will conduct DT/OT tests on the system in 1984 and make a production decision in early 1985.

We report to Congress by September 30 of this year. Everything is on track.

Senator GOLDWATER. What is the muzzle velocity of the weapon?

General WAGNER. It is 270 meters per second.

General MERRYMAN. When you say weapons, sir, you mean Viper?

Senator GOLDWATER. Yes.

General MERRYMAN. That is one of the reasons it looks so attractive because it is much faster than the current LAW. The current LAW, if you have seen one fired is kind of slow.

Unfortunately, the need for additional muzzle velocity is one of the things that gave us some problems.

PERSHING II

Fiscal year 1984 RDT&E request, $22.8 million.
Fiscal year 1984 weapons systems, procurement request, $432.8 million.
NATO counter to Soviet threat.
Evolutionary modernization of current system.
Greatly increased range and accuracy.

95 in fiscal year 1984 request, [deleted] total buy.
Fiscal year 1984—3rd year of production.
Initial operational capability (IOC) scheduled December 1983.

This next system, Senator Goldwater, I need to talk to you about because we need your help. I can't say too much about the importance of this system, the Pershing II.

I am sure you know that the President has a lot riding on the program. The chart is self-explanatory.

PERSHING SYSTEM

What has happened with the Pershing system this year is that we have been marching toward a December IOC (initial operational capability) in Europe. We have run five tests. The first test was a disaster. It blew up 17 seconds off the pad because the first stage leaked.

In the second test, we got it up in the air, but as it came back down the reentry vehicle did not operate correctly. So, we had some problems there.

The last three tests have been complete successes.

What I would like to show you is a short film of the last test to show you why it is important that we proceed with this system. You will be able to see why the President is interested in having it as a bargaining chip.

This (film) is the missile taking off at White Sands. This particular missile in this shot is using only one stage. I will tell you later about that. You will see the missile motor burn out.

What you see moving out there, that bright spot, is the reentry vehicle. The remarkable thing about that reentry vehicle is that it uses radar correlation to decide where it is supposed to go.

You will see it coming down. We are shooting at a shack, as a matter of fact, this particular corner of the shack. You will see where the reentry vehicle in comparison to where it is supposed to land near the shack.

Visualize this at 1,800 kilometers. There is the shack. That is your point of impact. There is your shack. That is what we were shooting at. That is where it landed.

Think what that will do to your airfield problem in Europe if you have a capability of [deleted] at a range of about 1,800 kilometers. That is why we are interested.

Senator GOLDWATER. Rather than a short technical paper on this, I am interested in how you put the coordinates into the guidance system.

General MERRYMAN. You take a little tape cassette and you literally read the data that is on the tape into the airborne computer in the reentry vehicle. The entire missile is like this pen. You have one stage which is the gray, you have a stage which is the red and that gray tip, up here is the reentry vehicle.

You insert a cassette into a special panel in the erector launcher and that puts a radar map into the computer of what it is you want to hit out there. What happened, on this shot you saw, as the reentry vehicle came down, it made 11 corrections, matching up with where it is supposed to go.

Senator GOLDWATER. I would like to have a paper on that.

General **Merryman**. I will get you one.

Pershing II Status

Fiscal year 1982 procurement appropriation—$219 million.

Initial production contract awarded—June 1982.

Fiscal year 1983 procurement request—$508.6 million.

First CRA supported program: SASC, HASC, SAC—full support; Army exercise fiscal year 1983 production contract—October 1982.

Second CRA (fiscal year 1983 defense appropriation) denied procurement.

Army has continued fiscal year 1983 program: Congressional commitment to the modernization; avoid termination/restart costs; legal determination.

Flight test results: Long range performance demonstrated; terminal maneuvers/accuracy proven.

Fiscal year 1983 supplemental funding required by May 1983: Impact on other programs; FOC delay.

We are on contract with this system but we don't have any money to be on contract with. What happened is that in fiscal year 1982 we had $219 million appropriated. We awarded the first production contract in June 1982. That contract had in it an option to produce 91 missiles in fiscal year 1983. That option had to be exercised in the fall of 1982.

The 1983 procurement request was for $508 million. By the time we had the first CRA last fall we had your support and that of the House Armed Services Committee and Senate Appropriations Committee. We exercised the option of that first contract in October 1982.

Shortly thereafter a second CRA was passed and the House Appropriation Committee voted no money which the Senate Appropriations Committee and the subsequent conference supported. That put us in a position, at the end of the year, of being on contract with $342 million obligated with no money explicitly appropriated to the Army for Pershing II.

What we had to do was hold money out of our missile account in order to continue this program.

This Vu-Graph explains why we did that. All of the congressional committees including the House Appropriations Committee said they strongly supported the President's TNF modernization program. It would have cost over an additional $100 million to terminate what we started. We made sure that this action was legal.

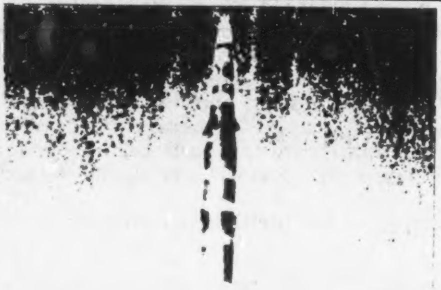
I have told you about the flight test results. What I am asking for is your support when you see our supplemental budget request which we have submitted to the Department of Defense and which they have submitted to OMB.

Senator **Goldwater**. I think you can depend on our help. Your problem is going to be with the House.

PERSHING II FINANCIAL SUMMARY

PROGRAM UNIT COST*
(CONSTANT FY84 $)

DEV EST FY79	108.3
FY83	144.9
FY84	160.3



COST GROWTH

FY83-84	11.0%
TOTAL	48.0%

		FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E		556.3	111.0	22.8	.05	.05	690.2
WPN SYS PROC		229.5	0	432.8	445.2	[Deleted]	[Deleted]
QTY	BATTERY SETS	3 2/3	0	4	0		
	MISSILES	21	0	95	104		

$(000,000)

*1 UNIT CONSISTS OF 9 LAUNCHERS AND 9 MISSILES

General MERRYMAN. This chart shows you the financial summary which I show for all systems. It shows you we have 11 percent growth in 1984.

The bottom section shows you the funding level over the years.

MULTIPLE-LAUNCH ROCKET SYSTEM (MLRS)

Fiscal year 1984 RDT&E request, $1 million.
Fiscal year 1984 weapons system procurement request, $551.6 million.
Massive firepower beyond range of cannon artillery.
Devastating against enemy concentrations.
36,000 rockets/76 launchers in fiscal year 1984 request.
362,832 rockets/333 launchers total buy.
Fiscal year 1934—5th year of production.
29,850 rockets/184 launchers procured through fiscal year 1983 FDP.

The next system I will cover is the multiple launch rocket system [MLRS]. If you remember, this is the system that will go out to [deleted] that has 12 rockets on the back of a track similar to the Bradley fighting vehicle. It will have a three-man crew.

It has a warhead that right now carries 644 dual purpose improved conventional munitions. They will penetrate, I think, 2¾ inches of armor and also have an anti-personnel capability.

If you can imagine these things, 12 rockets with 644 of these little submunitions, which is one of the best buys we have delivered at $3.50 apiece; they provide an awesome capability against materiel out to a range we cannot cover at present with our cannon weapons.

We will field our first MLRS battery—initial operational capability [IOC]—at Fort Riley this year and also the first battery in Europe.

The R&D dollars will continue development of test program sets and the procurement dollars will buy us 36,000 tactical rockets and 76 launchers.

MLRS Highlights

Fiscal year 1982 accomplishments: completed flight developmental testing (DT)—May 1982; initiated production qualification testing (PQT)—May 1982; began production deliveries—May 1982 (rockets), August 1982 (launchers).

Fiscal year 1983 status/plans: Operational testing (OT) III conducted—October 1982 through December 1982; PQT flight testing completed—February 1983; joint DT/OT flight testing completed—March 1983; remaining ground testing completed—March 1983; full-scale production decision—March 1983; IOC Battery at Fort Riley—March 1983; 1st European battery—September 1983; production contract award—4th quarter fiscal year 1983.

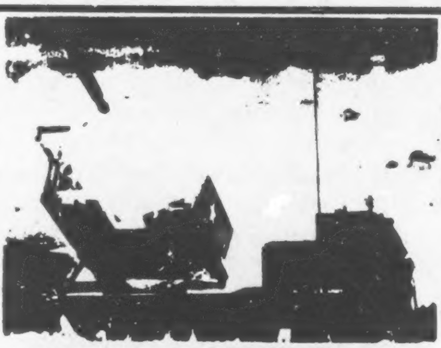
Here is what we have done in 1982. We have done a lot of testing. We found we had some problems for which we have found fixes. We don't see any problem so extensive as to delay anything. We will make our full-scale production decision this month.

In 1983 we plan to do some additional testing. We will award our full-scale production contract in the fourth quarter of 1983.

MLRS FINANCIAL SUMMARY

PROGRAM UNIT COST*
(CONSTANT FY84 $)

DEV EST FY78	20.42
FY83	10.62
FY84	11.09



COST GROWTH

FY83-84	4.4%
TOTAL	– 45.7%

		FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E		303.6	23.1	1.0	4.0	0	331.7
WPN SYS PROC		386.8	444.4	551.6	619.9	1792.8	3795.5
QTY	ROCKETS	6210	23640	36000	50472	246510	362832
	LAUNCHERS	112	72	76	44	29	333

$(000,000)

*1 UNIT IS A LAUNCHER AND 1140 ROCKETS

This shows you that we have 4.4 percent cost growth in 1984 and that overall the program went down 45 percent. Now, I have to be honest with you. That is not only because there was some excellent management here. If you remember, last year I had the project manager and he was the outstanding PM of the year. But the reason that went down 45.7 percent is that we increased the buy. So it was not totally due to good management on our part.

JOINT TACTICAL MISSILE SYSTEM (JTACMS)

Fiscal year 1984 RDT&E request, $50.2 million.
Fiscal year 1984 weapons system procurement request, none.
Attacks second echelon enemy formations.
Formerly corps support weapon system (CSWS).
Joint Army/Air Force program.
Operational in late 1980's.
Fiscal year 1984—initiate full scale engineering development.

This system now, Senator Goldwater, is the one I talked to you about the day before yesterday when I told you we needed a capability better than the Lance missile, possibly air fired, to go after second echelon forces. They call it JTACMS.

JOINT TACTICAL MISSILE SYSTEM (JTACMS)

The program is a joint effort with the Air Force. You probably remember the CSWS, corps support weapon system. That is what this is. It has been combined with the Air Force's CSW missile or coventional standoff weapon.

The R&D dollars will initate full-scale engineering development for this year. We plan to get the RFP out later in the fourth quarter and we will look for a program decision to go ahead with full-scale engineering development in the October 1983 timeframe.

Senator GOLDWATER. Do you think it is practical to have two services developing the same weapon?

General MERRYMAN. Part of what we are trying to do is practical and part of it I am not sure we can pull off. What OSD (Office of the Secretary of Defense) would like to have is a single, common missile capable of being shot from the ground and also shot from an airplane. You can hardly do that, but you can have a lot of commonality. You might be able to have a common booster. You might be able to have a common warhead. You might be able to have a common inertial guidance system, but it is unlikely that you would have all three the same.

The aircraft, as you know, can't carry as much as you can place on the ground. There are tradeoffs that I think we are going to have to make, and I think that what we will end up with is a missile with certain common components, but there will be some differences. We are shooting for an IOC in the late eighties.

What we are looking at, Senator Goldwater, is something that will give the Army a range capability of shooting 200 kilometers. The emerging results of what the Air Force is looking at is something that will give them a range of about 277 kilometers, but that is going to change as the study group continues to formulate its conclusions.

Our plan is to award the full-scale engineering development contract in the third quarter of 1984.

We don't have final dollars on this because we don't know for sure what it is going to look like yet. We don't know how much commonality there is.

What you see are the dollars we have in the program. As soon as we know, and we will know more this year, we will inform your staff as to the status.

Senator GOLDWATER. What do you think the total R&D will be?

General MERRYMAN. Let me give you an honest answer on that.

We have a thing called the long range research and development plan that we use in the Army to try to keep us on course. It covers 15 years. What we have projected is an R&D cost on this of a little over 1 billion dollars in R&D now.

We don't know if that is right, but that is what we think it is or we think it will be at this date.

COPPERHEAD

Fiscal year 1984 RDT&E request, none.
Fiscal year 1984 weapons system procurement request, $75 million.
155-mm artillery point target capability.
High kill probability.
1,415 in fiscal year 1984 request, 9,910 total buy.
Fiscal year 1984—5th year of production.
8,495 procured through fiscal year 1983 FDP.

This next system is another one I will explain and ask your help on. Copperhead is a laser-guided artillery weapon. You can put it in any 155mm howitzer on the battlefield and 75 percent of our artillery is 155s.

COPPERHEAD

It will go up to 16 kilometers. It has a high capability of killing point targets.

We ,have some problems with it and I am going to cover those with you in the next chart.

COPPERHEAD HIGHLIGHTS

Fiscal year 1982 accomplishments: Initial production tests—64.8 percent reliability; special reliability demonstration, June 1982—67 percent reliability; delivered 1,114 rounds (fiscal year 1980 contracts).

Fiscal year 1983 status/plans: Lot acceptance test, July 1982 through February 1983—81 percent reliability; monthly delivery rates started increasing—February 1983; present reliability is 78 percent.

This shows you what we have done this year. We have run through some production tests and reliability demonstrations and we were able to get 64 and 67 percent reliability out of those first tests when we were shooting for 80 percent.

After the reliability demonstration in June we did what we call the lot acceptance tests. What that is, sir, is that out of each number of missiles produced each month you go in and pick 13 out of 200, pick them indiscriminately, and you go out and shoot them. From July through February those tests have shown that we are now at 81 percent reliability.

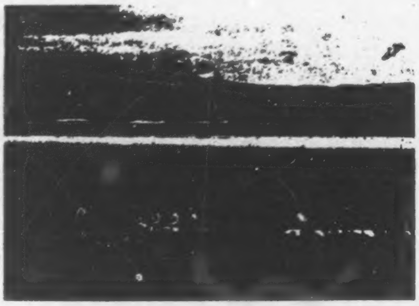
So, we are above what we set out to achieve. That is out of 108 fired we have hit 87 of the targets we shot at.

What we are asking money for this year is to buy sufficient rounds for the Rapid Deployment Force [RDF]. But I need to inform you that the Army is looking at this program and may modify the program I am briefing you on today. We will keep your staff fully informed if anything changes from what I have just told you.

COPPERHEAD FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY84 $)

DEV EST FY75	12.7
FY83	81.6
FY84	85.9



COST GROWTH

FY83-84	5.3%
TOTAL	576.4%

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	151.9	0	0	0	0	151.9
WPN SYS PROC	396.5	45.0*	75.0	0	0	516.5
QUANTITY BUY	7695	800	1415	0	0	9910

*INCLUDES $30M REPROGRAMMING APPROVED BY OSD

$(000,000)

This shows you the costing. The one point that will get your attention here is the total increase. That total percent increase of 576 percent results from the decrease in the program buy. Where we originally planned to buy 133,000 projectiles and now we are down to 9,900.

So, when you do that to the program, you can see what it does to your cost growth.

REMOTELY PILOTED VEHICLE (RPV)

Fiscal year 1984 RDT&E request, $138.1 million.
Fiscal year 1984 weapons system procurement request, none.
Extended range target location/designation.
Operational to full range of artillery.
Fiscal year 1984 request, continues R&D.
995 air vehicles/74 ground systems total buy.
Early fielding 1985.

REMOTELY PILOTED VEHICLE

The RPV is one system you are familiar with. That vehicle will perform out to better than [deleted]. It will carry a small television and also have a laser designation capability. In a later version we are going to field a model with television and a laser designator, and a couple years later we will put a FLIR, a forward looking infrared system, on so that it will work at night.

We think so highly of this program we have put an additional half billion dollars in the POM years so that we can expedite fielding the weapon system in 1987 versus 1988.

Procurement starts in 1985. R&D dollars will fund development test, fabrication of 13 vehicles, development of logistics packages, start of full scale development of a night capability, fabrication of 10 air vehicles, and two ground systems for early fielding in early 1985.

The [deleted] you have probably read about it.

It is interesting that they used [deleted].

Senator **Goldwater**. The RPV is really quite simple—something you might make in the back yard for $25.

Dr. **Sculley**. I should point out that it had ATV capability and [deleted].

RPV Highlights

Fiscal year 1982 accomplishments: Contractor flight testing (17 flights)—July 1982 through November 1982; demonstrated launch, automatic recovery, navigation, and transmission of TV video; program go ahead, funds added—September 1982.

Fiscal year 1983 status/plans: Demonstrated transmission of TV video—February 1983; continue contractor flight testing with antijam data link and TV—August 1983; conduct field test with 9th Division—November 1983 through December 1983.

General **Merryman**. Here is what we have done in the last year and a half. We started our contractor flight tests. There were 17 flights last year. All of them were successful except one. In one the computer software fouled up and he couldn't find his way home, so the aircraft crashed.

As I mentioned earlier, we have added a half million dollars to expedite the RPV program. We have tested the TV video portion of the communications link, and we have found it to be effective at [deleted].

We will continue testing this year and we will field a system early to do operational concept tests with the 9th Division. Soldiers will operate the system.

Senator **Goldwater**. If we find it necessary, do you have a film taken from the aircraft which can be shown to the full committee?

General **Merryman**. Yes, sir. As a matter of fact, we will get you that film. I saw one 2 years ago where we took the film from the air vehicle, TV camera. In the film you find the target tank and lase it with the air vehicle laser, shoot an artillery round, Copperhead, and you see the round going in and hitting the tank.

Senator **Goldwater**. This is a subject that not many of our Members may understand.

RPV FINANCIAL SUMMARY

		FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E		183.3	77.7	138.1	103.0	37.9	540.0
WPN SYS PROC		0	0	0	141.6	1214.0	1355.6
QTY	AIR VEHICLES	0	0	0	48	947	995
	GROUND SYST.	0	0	0	9	65	74

$(000,000)

General MERRYMAN. The next chart shows the funding. This is not a system acquisition review [SAR] system so I don't have the breakout as I have in the others as far as cost. This shows you the system we plan to buy, air vehicles; ground systems, and total program costs.

JOINT SURVEILLANCE AND TARGET ATTACK RADAR SYSTEM (JSTARS)

Fiscal year 1984 RDT&E request, $69.4 million.
Fiscal year 1984 weapons system procurement request, none.
Joint Army/Air Force program.
Airborne surveillance radar for "see deep" requirement.
Multiple ground stations, common data links.
Early fielded capability.

This next system now you may have heard referred to as Joint STARS. It is the joint surveillance and target attack radar system. It is something that will work in conjunction with the joint missile program that I briefed you on a few minutes ago.

JOINT STARS

If you remember, Senator Goldwater, we came in 2 years ago and asked for money for a system called Standoff Target Acquisition System. This was for a helicopter that would go up and have a moving target indicator radar that would tell the division commander what the other side was doing.

He would know where the other guy's tanks and things were up to [deleted] kilometers forward of the line of contact. What this system is is a replacement for SOTAS.

The reason we have had to do this is because the Congress took the money for SOTAS 2 years ago because the cost had risen too high. It was just unaffordable.

At the time we had planned to put the SOTAS in each division. We had planned to put six systems in each division. What we will do with this system is put it back in the Corps. To further lower its cost, rather than put it in a helicopter, we will put it in the OV-1, the Mohawk, that Grumann makes.

The reason we are doing that is that we have OV-1's, and we don't have to buy additional airframes to mount this system.

This is a joint program being developed with the Air Force. Their current plans are to put it in the C-18, a growth version of the same radar.

JSTARS Highlights

Fiscal year 1982 accomplishments: Established joint program office—USAF lead; concept/requirement/feasibility studies; began preparation of request for proposal/system specification.

Fiscal year 1983 status/plans: Baseline system specification; gain approval of acquisition plan; prepare and release request for proposal; perform technical evaluations of contractor proposals; negotiate with contractors; continue development and ground stations and data links.

This chart shows you what we have done in the past year and a half. We have established the joint office. We have continued to do studies to make sure that we are on the right track. We have completed our baseline system specifications, negotiated with our contractors and we are continuing to develop our ground stations.

The ground station will be the same thing that we were developing back with the SOTAS, so we will save some money there. The same is true for the data links.

I might mention one of the data link candidates for this is the same data link as for RPV, so we are not going to have to develop two separate data links.

Senator **Goldwater**. What IOC are you shooting for?

General **Merryman**. We are shooting for 1987 on this one, sir.

This shows you the funding stream. The reason we don't have the final figures on this one is the same reason as on the other. It is a joint program. We don't have a fully approved Department of Defense program that lays out what the dollar stream will be. Those are the dollars we currently have in the POM and we will keep your staff informed when we get a Secretary of Defense approval as to what the full program consists of.

Fire-Support-Team Vehicle (FISTV) Modification

Fiscal year 1984 RDT&E request, none.
Fiscal year 1984 weapons system procurement request $136.8 million.
Mobility and armor protection.
Improved capability for locating and designating targets.
200 in fiscal year 1984 request, 1,314 total buy.
Fiscal year 1984—2nd year of production.
64 procured through fiscal year 1983 FDP.

FIRE-SUPPORT-TEAM VEHICLE (FISTV)

This is the FISTV we briefed you on last year. This is where we take the fire support team and put it under armor.

We also provide the team with a laser so that it can lase the target. It also has the capability of providing directional data.

That device also enables the crew to determine where it is and lets the other units working with it know where it is. The importance of the FISTV is that it puts men in armor on top of a hill. It would be difficult for them to survive without this protection in case of a war.

FISTV (MOD) Highlights

Fiscal year 1982 accomplishments: Engineering development test—December 1981; performance qualification test (PQT) began—August 1982; operational test (OT) II began—September 1982.

Fiscal year 1983 status/plans: OT II completed—December 1982; PQT completed—January 1983; production readiness review—February 1983; type classification—April 1983; production contract award—June 1983.

This shows you where we are as far as the last year and a half. We have gone through our engineering development test. We had some minor problems with a night sight cooling malfunctioning that we have solved by changing the type of coolant.

We had some gyro problems which we have solved by training our crews how to operate with them.

We ran through some performance and qualification testing. The only problem we ran into there is that we had some mounting surface wear that caused bore sighting problems. We are working to fix these.

None of these problems are major, but I am just telling you what took place. We are in development and operational testing (DT/OT) now. We don't have the final result, but I am informed the emerging results look good.

This is the funding stream for FISTV. A total buy of 1,314.

FISTV FINANCIAL SUMMARY

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	27.2	6.9	0	0	0	34.1
WPN SYS PROC	0	50.3	136.8	221.6	342.1	750.8
QUANTITY BUY	0	64	200	417	633	1314

$(000,000)

Senator GOLDWATER. What is your unit cost on that FISTV?

General MERRYMAN. The average unit procurement cost in fiscal year 1984 dollars is $509,000.

FIELD ARTILLERY AMMUNITION SUPPORT VEHICLE (FAASV)

Fiscal year 1984 RDT&E request, none.
Fiscal year 1984 weapons system procurement request, $104.7 million.
Armored ammunition resupply vehicle.
Vital for European scenario.
217 in fiscal year 1984 request, 1,464 total buy.
Fiscal year 1984—2nd year of production.
54 procured through fiscal year 1983 FDP.

This vehicle is the one I briefed you on last year. This is a field artillery ammunition support vehicle or FAASV. We plan to field these in Europe only. The reason we need them badly is because of the Soviet preponderance of artillery in the European theater.

We will take our 8-inch round and 155mm rounds under armor up to the howitzer where we will resupply the howitzer under cover.

Today what we use is a vehicle called the M548 which is a canvas top vehicle. We have done some analysis that shows this new system will increase our survivability significantly, to the extent that we would have 45 percent fewer crew casualties and lose fewer artillery tubes.

The dollar request here would buy 217 vehicles and provide several million dollars for initial spares. Contract award is planned for late April of this year. IOC is April 1985.

FAASV Highlights

Fiscal year 1982 accomplishments: Development test—November 1981 through April 1982; operational test—January 1982 through April 1982.

Fiscal year 1983 status/plans: Type classified/limited production—February 1983; award production contract—April 1983.

We have been through the DT and OT this past year and with this system, Senator, we had some problems. We had problems with the projectile locking mechanism. We found that the exhaust pipe was too close to the fuel port. We found that the fire extinguisher didn't work exactly right. The travel lock from the ammo stacker did not work exactly right. We had an ineffective canister rack and a few other shortcomings. None of these are what we would call show stoppers, but they are extensive enough to where our Training and Doctrine Command at Fort Monore has decided to let us go into what we call limited production rather than go into full-scale production. That means we have to come back and show that we have these things fixed. They decided since the need in Europe was so urgent that we needed to go on with it, to get the 155mm support vehicles configured for 155mm ammunition to Europe and hold up on the 8-inch vehicle which had the shortcomings before we release them for Europe.

FAASV FINANCIAL SUMMARY

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	5.6	0	0	0	0	5.6
WPN SYS PROC	0	30.7	104.7	144.2	533.3	812.9
QUANTITY BUY	0	54	217	274	919	1464

$(000,000)

This is the funding stream. We would buy 1,464 at a cost of $813 million.

Senator Goldwater. What is the unit cost?

General Merryman. $493,000. That is in fiscal year 1984 constant dollars.

Patriot Air Defense System

Fiscal year 1984 RDT&E request $84.6 million.
Fiscal year 1984 weapons system procurement request $1127.2 million.
Engages multiple targets in electronic countermeasures (ECM) environment.
Replaces Nike Hercules and some I-Hawk.
525 missiles/15 fire units in fiscal year 1984 request.
[Deleted] missiles/103 fire units total buy.
Fiscal year 1984-5th year of production.
710 missiles/31 fire units procured through fiscal year 1983 FDP.

PATRIOT

The Patroit system I am sure you are familiar with. This is our new air defense system. To put it in a nutshell, the reason we need this is out there today we have the old Hercules which was coming in shortly after I went in the Army.

The Hercules can take on [deleted] at a time. Over the last 30 years the Soviets have built an awful lot of aircraft. In the fifties they didn't have too many, if you remember. Now they have a lot.

So [deleted] bird at a time is not enough. With this system we can take on up to [deleted] birds at a time and we can track up to [deleted] at a time. So, it is a significant breakthrough as far as providing air defense for our forces overseas.

In addition to the Hercules it will also replace some of the Hawks.

This chart shows you that in 1984 we need our RDT&E for some preplanned, product improvements to counter more sophisticated threat electronic countermeasures, and the procurement request is for initial spares, 525 missiles and 15 fire units.

The first battalion will have an IOC in May of this year and the second battalion will have an IOC in the spring of next year. That will be in Europe.

Senator **GOLDWATER**. What is the size of that missile?

General **MERRYMAN**. This one is 16 inches in width as I recall.

Senator **GOLDWATER**. How long is it?

General **MERRYMAN**. I will have to get you that, sir. It is much smaller than the old Hercules.

Senator **GOLDWATER**. You may put that in the record.

[The information follows:]

PATRIOT

General **MERRYMAN**. The Patriot missile itself is 209 inches (17.4 feet) long.

General **MERRYMAN**. This shows you what we have done during the past year with the Patriot.

PATRIOT HIGHLIGHTS

1982 accomplishments: successful completion of third unit of verification tests; delivery of first production hardware; training of Army instructors and key personnel completed; successful completion of component design confirmation tests; construction of first U.S. tactical site in USAREUR initiated.

Fiscal year 1983 status/plans: System design confirmation tests completed; follow-on evaluation tests planned; first battalion IOC—Conus; foreign interest in acquiring Patriot increasing.

If you remember, we had some problems with this a couple years ago. OSD said we had to run some verification tests to make sure it is reliable, to make sure it really can take on those [deleted] aircraft and to make sure the software works.

I am happy to report to you we have done that and the system reliability exceeds the Department of Defense criteria. We did demonstrate we could take on [deleted] aircraft and track [deleted]. We did meet all OSD criteria so far as software endurance and tracking missions.

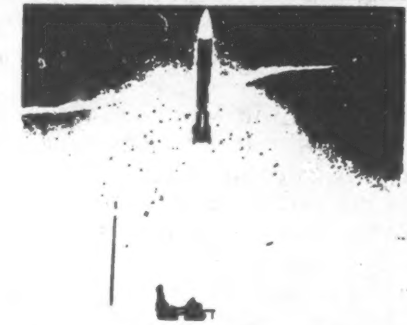
The first production unit was delivered in June 1982.

The only other thing that is of interest to you, sir, that I might mention is that foreign interest seems to be increasing in this system. Of course, that is good news because that would mean money coming into the United States.

PATRIOT FINANCIAL SUMMARY

PROGRAM UNIT COST*
(CONSTANT FY84 $)

DEV EST FY72	47.2
FY83	107.3
FY84	111.7



COST GROWTH

FY83-84	4.1%
TOTAL	136.7%

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	1909.9	46.9	84.6	69.6	132.4	2243.4
WPN SYS PROC	1690.4	845.9	1127.2	1312.1	4205.6	9181.2
QTY FIRE UNITS	19	12	15	17	40	103
QTY MISSILES	423	287	525	815	4167	6217

$(000,000)

*1 UNIT IS ONE FIRE UNIT OF 8 LAUNCHERS AND 64 MISSILES

This shows you that we have had a 4.2-percent cost growth in the past year. It also shows you that the cost growth over the program total is 136.7 percent.

Now the reason for this cost growth is not because the program is all fouled up. Most of that cost growth results from the fact that we reduced this program significantly in scope from its initial program buy.

We took out, as a matter of fact, over 50 percent of the planned fire units that we planned to buy. That drove the cost growth up dramatically.

ANTITACTICAL MISSILE (ATM)

Fiscal year 1984 RDT&E request $33.3 million
Fiscal year 1984 weapons system procurement request, none.
Joint service program.
Counter to Soviet tactical missile threat.
Near term—improved existing systems.
Long term—new development.

ATM

This is a new system which I don't believe we have talked about. The reason that I need to tell you about it today is because the Soviets continue to increase the number of missiles that they continue to plant across the border, SS-20's, SS-21's, SS-22's, SS-23's.

In addition to the increasing number significantly every year, their capabilities are also increasing significantly.

I showed you what our Pershing can do just a moment ago. Their current missiles, sir, have [deleted]. Compare that to our Pershing which is [deleted]. But within a few years they will have a similar capability to our Pershing.

Our intelligence experts project that one of the missiles already had it [deleted]. So you are talking about something similar to what you saw.

Why that is scary is, think what they can do to our airfields, think what they can do to our Patriots over there. So, we have to come up with some way to counter this threat.

What we plan to do, sir, is to look at what is necessary to improve the Patriot as a near-term fix to try to get an antitactical missile capability, look at what could or should be done to the Hawk missile and then look at what we must do as far as the follow-on.

In other words, determine what it is you can't do with the Patriot and the Hawk that you have to have another capability for. That is what this program is all about. We are starting that this year.

ATM HIGHLIGHTS

Fiscal year 1982 accomplishments: Defense Science Board Report on ATM; Provisional Project Office established.

Fiscal year 1983 status/plans: [deleted]; begin definition of long-term requirement.

One point I want to make with this chart is to say that the Defense Science Board pointed out just this past year what I told you about the Soviet threat and reaffirmed to us that the threat is serious and it is getting worse.

The other point is that we have set up a program office. What we are working on now is to define what our requirements are as regards the Patriot and Hawk in the long term.

Here again, since we do not have this program defined, I can't tell you what the total program will cost. I can only show you what is in our program.

STINGER

Fiscal year 1984 RDT&E request, none.
Fiscal year 1984 weapons system procurement request $137.8 million.
Soldier's portable air defense weapon.
All aspect engagement capability.
Stinger postupgraded performance vs. countermeasures.
1,508 missiles in fiscal year 1984 request, 46,206 total buy.
Fiscal year 1984—6th year of production (Stinger)/2nd year (Stinger post).
9,291 Stingers/44 Stinger postprocured through fiscal year 1983 FDP.

STINGER

The Stinger is our new air defense missile system that replaces Redeye. If you remember, last year I told you the old Redeye was a tail chase weapon. It worked well if the enemy aircraft went by you and didn't get you, then you could get him. But if he got you, it was history.

This missile has the capability of taking on an enemy aircraft from the front or from the side. That is the capability of the Stinger. As soon as we developed the Stinger the Soviets threw some more money in the game. [Deleted].

So, what we are doing with the Stinger is putting a modification on it that we call Stinger-POST. This improvement will take care of the [deleted].

We are also looking at further modifications that may be required because of some late information that we are getting about the Soviet threat.

What I am briefing you on this morning is what we are doing. We are asking for dollars to buy the last pure Stingers and for dollars to build the first Stinger-POST.

STINGER HIGHLIGHTS

Fiscal year 1982 accomplishments: Stinger postdevelopmental, operational, and performance qualification testing completed; continued Stinger European deployment; equipped first RDF unit; MOU negotiated for European coproduction.

Fiscal year 1983 status/plans: Stinger postproduction decision; continue RDF and European deployments, start Korean deployments; approved and sign European coproduction.

This chart talks in terms of the testing we have gone through the past year. We have had 10 contractor flight tests, 6 successes and 3 failures and 1 no test. We have had 15 Government qualification tests, 8 successes, 3 failures and 4 no tests.

We have put the results through the computers to analyze what all of this told us. We have been told that the requirement is validated and the overall conclusion is that the performance of the Stinger-POST warrants it going into production.

A decision was made last month an ASARC, that is, an Army Systems Acquisition Review Council, where Dr. Sculley and myself and the Vice Chief and Under Secretary make a decision to put something in production or not put it in production. The decision was to go into production with the Stinger-POST.

This year we will deploy some Stinger teams to Europe. We will provide Stinger teams for the 82d Airborne. As a matter of fact, later this year we will also send some to Korea and continue to send them to Europe.

STINGER FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY84 $)

DEV EST FY72	46.3
FY83	72.3
FY84	75.0

COST GROWTH

FY83-84	3.7%
TOTAL	62.0%

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	217.5	0	0	0	0	217.5
WPN SYS PROC	472.5	212.1	137.8	345.7	2422.2	3590.3
QUANTITY BUY	7079	2256	1508	2610	32753	46206

$(000,000)

This chart shows you that the increase in cost over the past year has been 3.7 percent; over the program, 62 percent.

Black Hawk

Fiscal year 1984 RDT&E request, none.
Fiscal year 1984 weapons system procurement request, $480.6 million.
Day/night, adverse weather air mobility.
Improved payload, speed, survivability, reliability.
84 in fiscal year 1984 request, 1,107 total buy.
Fiscal year 1984—8th year of production.
529 procured through fiscal year 1983 FDP.

BLACK HAWK

This is the Black Hawk. You are familiar with this one. It is a fantastic aircraft. We have bought quite a few of these now. We have accepted 373 as of the end of February. We are on a multiyear contract with Sikorsky that I am sure you are aware of. It is a fixed price contract.

Whereas we had money problems with this one 2 years ago, that is now behind us. This aircraft has the capability, as you know, of lifting just about anything you can get in it. You can externally carry an artillery piece, the ammo and the crew inside.

The first time I flew it last year it scared me because I went to helicopter school back in the midfifties. You were always worried about pulling off your RPM when you pull up the collective. In this aircraft if you pull it like any other helicopter, you are at 2,000 feet before you know it. It has a similar engine as the AAH-64.

Senator GOLDWATER. It has terrific power. I think the Navy is interested in that.

General MERRYMAN. Yes, sir, for their LAMPS program.

BLACK HAWK HIGHLIGHTS

Fiscal year 1984 accomplishments: First major system MYP contract—fiscal year 1982 through fiscal year 1984; external stores support system (ESSS) first flight—March 1982; hellfire feasibility demonstration-May 1982.

Fiscal year 1983 status/plans: T700 engine series multiyear contract (fiscal year 1983–85) planned—April 1983; ESSS operational testing II—June 1983; ESSS implementation in production line—August 1983.

This tells you where we are this past year. It is our first multiyear contract. We have put an external stores system on it so that we can put gas tanks on it that will enable us to self-deploy the aircraft to Europe.

We also ran a Hellfire feasibility demonstration where three Hellfires were fired, by congressional direction.

In 1983 we plan to go out with a multiyear contract on the engine. We plan to do some operational testing on the stores system and to implement the stores system in the production line.

BLACK HAWK FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY84 $)

DEV EST FY71	5.48
FY83	6.80
FY84	6.69

COST GROWTH

FY83-84	– 1.6%
TOTAL	22.1%

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	495.9	5.6	0	0	0	501.5
WPN SYS PROC	2278.8	584.4	480.6	534.0	3005.1	6882.9
QUANTITY BUY	433	96	84	78	416	1107

$(000,000)

HELLFIRE ON BLACK HAWK FEASIBILITY

Senator GOLDWATER. What do you think of putting the Hellfire on the Black Hawk?

General MERRYMAN. What we did was to provide the aircraft the capability to carry Hellfire. The problem with using this bird as a

Hellfire platform is that, one, you are only going to buy about 1,100 and we need them for other purposes than as an attack helicopter.

If you qualify it, and being an aviator you know what I am talking about, so that you can shoot it in a nonautonomous mode, all you provided is the capability to shoot missiles off the bird and have somebody else lase for it, it would cost between $63 and $73 million.

We estimate that if you provided an autonomous capability, putting the sights and everything inside the bird to find the target and then lase from the Black Hawk itself, we estimate it would cost well over $230 million.

Now, the user tells us that we don't have enough birds like this to spend money for it. We can't afford some of the things that we need very badly right now.

So, the Army doesn't want to do that.

We are impressed with Hellfire, and we are looking at potential ground uses of Hellfire. We don't know for sure if we are going to do anything in that regard. We are just looking at it.

CHINOOK (CH-47D) MODERNIZATION

Fiscal year 1984 RDT&E request, none.
Fiscal year 1984 weapons system procurement request $344.0 million.
Improved medium lift helicopter.
Modernization extends fleet lift beyond year 2000.
36 in fiscal year 1984 request, 436 total buy.
Fiscal year 1984—4th year of production.
52 procured through 1983 FDP.

CH-47

The CH-47 you are familiar with, sir. This is where we take the old A, B and C models and modify them to the D model so that all of them now will have 15,000-pound capability.

Senator GOLDWATER. That is your biggest lift, isn't it?

General MERRYMAN. That is right. It is currently our biggest lift.

Senator GOLDWATER. Don't you need a bigger lift? I remember a few years ago we were talking about the possibility of 22,000.

General MERRYMAN. In the HLH, the goal was 22.5 tons.

Senator GOLDWATER. Does the Army need a heavier lift than this?

General MERRYMAN. We have some dollars this year with NASA where we are taking some of the parts of the old HLH that we were building back in the midseventies and finding out what we can learn from them, the transmission specifically. What we are trying to do is expand the technological base in materials and engineering to lift 22.5 to 35 tons. The state of the art in materials must be expanded to avoid catastrophic failure.

It is not as simple as making it bigger. Do we need something bigger? Yes.

Senator GOLDWATER. Don't the Soviets have the MI-6?

Dr. SCULLEY. MI-26.

General MERRYMAN. They have the MI-6 and MI-26, both of which are larger.

Senator GOLDWATER. Did they ever go into production on the MI-6?

General **Merryman**. I think the MI-6 is the old one. Isn't that the old Hook? I believe the MI-6's were Hook.

Dr. **Sculley**. That is the MI-8, sir. Excuse me, MI-6 is the Hook.

Senator **Goldwater**. What is the lift on that? Fifty thousand?

General **Merryman**. I don't have the capability, but it is way up there. The Halo, which is their new one, is now bigger than the Hook, has an even greater capability.

So, they have two that are considerable larger than ours. The problem, Senator Goldwater, in all honesty is one of affordability. If you remember, in 1975 we had to kill our old heavy-lift helicopter program. It was not a question of whether we needed it or not. It was a question of could we afford it when you looked at how many dollars we had and what else we needed.

CH-47D Highlights

Fiscal year 1982 accomplishments: 2nd production contract signed; 1st aircraft delivered; test measurement and diagnostic equipment (TMDE) test.

Fiscal year 1983 status/plans: 3rd production contract; 1st delivery to initial operation capability unit—28 February 1983; airworthiness and flight characteristics test—February 1983 through August 1983; first article testing—October 1982 through March 1983.

This shows you where we have been the past year. We have signed a second production contract. We are currently trying to get on a multiyear contract with this program that we have congressional permission to proceed on. That is in negotiation right now.

We have had our first D model delivered. In 1983 we will sign our third production contract. We will do the testing—I am showing you the first article testing—on air worthiness.

CH-47D FINANCIAL SUMMARY

PROGRAM UNIT COST
(CONSTANT FY84 $)

DEV EST FY75	5.27
FY83	6.05
FY84	6.41

COST GROWTH

FY83-84	6.0%
TOTAL	21.6%

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	113.5	0	0	0	0	113.5
WPN SYS PROC	407.1	262.7	344.0	422.2	1733.0	3169.0
QUANTITY BUY	28	24	36	48	300	436

$(000,000)

This shows you the dollar stream, 6-percent growth during the past year.

HIGH MOBILITY MULTIPURPOSES WHEELED VEHICLE (HMMWV)

Fiscal year 1984 RDT&E request, none.
Fiscal year 1984 weapons system procurrement request, $135.7 million.
Joint service program.
Multipurpose cross country tactical vehicle.
Complements CUCV program.
4,218 in fiscal year 1984 request, 50,838 total buy.
Fiscal year 1984—2nd year of production.
1,315 procured through fiscal year 1983 FDP.

HMMWV/CUCV

This next chart now shows you the first of two programs that are complementary to each other, the HMMWV and CUCV. As I told you last year, they are going to replace the ¼-ton jeep, 5/4-ton M880 series truck, one-half ton Mule, 5/4 ton Gama Goat and one-fourth ton trailers.

HMMWV is a vehicle you will find out in the front line and out where the combat forces don't have roads and you need a vehicle that can move out over any type of terrain.

Senator GOLDWATER. Who are making these?

General MERRYMAN. Three companies are competing. General Dynamics, Teledyne Continental Motors, and A. M General Corp.

We are getting ready to award a contract later this month. It will be for a 5-year multiyear and will be for in excess of 50,000 vehicles. The dollars that I am requesting in 1984 will buy 4,218 vehicles.

Senator **Goldwater**. Will that be a fixed price contract?

General **Mason**. With economic price adjustment, sir.

General **Merryman**. It is fixed price, but also if inflation goes out of sight——

Dr. **Sculley**. The escalation clause is really dictated, sir, using accepted Department of Labor statistics.

While I don't always agree, it is something that we can get agreement between the Government and the private sector on.

I think we stand to benefit if in fact inflation remains as moderate as it is today.

Senator **Goldwater**. If it remains, we are all right?

Dr. **Sculley**. I can assure you that our view of the inflation in the Army is that it is a manageable item.

Senator **Goldwater**. I wish you would keep us posted on how you proceed with this contract.

HMMWV Highlights

Fiscal year 1982 accomplishments: Developmental and operational testing; Army and Marine Corps, approximately 500,000 miles accumulated at a variety of test sites.

Fiscal year 1983 status/plans: Production contract award; squad carrier adaptation.

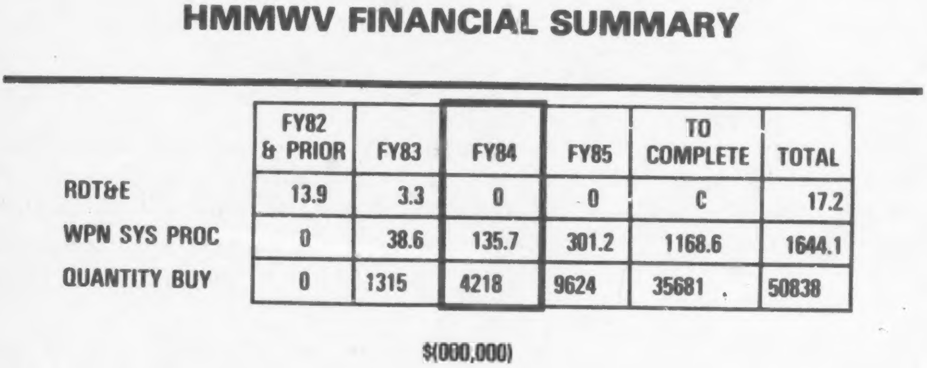
General **Merryman**. This shows you what we have done this year, sir.

We have finished Developmental and Operational [DT/OT] testing. We have driven these prototypes vehicles over 300,000 miles.

We plan to award the contract later this month.

The other thing we plan to do, is after we select the winner, is ask him to design an adaptation kit so that we can carry a squad in this vehicle.

This is a joint program with the Marine Corps and the Air Force. I should have mentioned that earlier. This shows you the funding stream and the number we will buy.



HMMWV FINANCIAL SUMMARY

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	13.9	3.3	0	0	C	17.2
WPN SYS PROC	0	38.6	135.7	301.2	1168.6	1644.1
QUANTITY BUY	0	1315	4218	9624	35681	50838

$(000,000)

Commercial Utility and Cargo Vehicle (CUCV)

Fiscal year 1984 RDT&E request, none.

Fiscal year 1984 weapons system procurement request, $191.7 million.

Joint service program.
Commercially available vehicle for tactical use.
Compliments HMMWV program.
15,346 in fiscal year 1984 request, 56,079 total buy.
Fiscal year 1984—3rd year of production.
16,651 procured through fiscal year 1983 FDP.

CUCV is what you call the sister vehicle. It is a commercially designed, four-wheel drive, diesel-engine vehicle. It will selectively replace the ¼-ton jeep, and all of the M880 series trucks. It is a vehicle that we will not have way up in the frontlines and out on the roughest terrain, but we will have it everywhere else. In procuring the CUCV, the Army is complying with the congressional direction to commercialize our ¼-ton fleet by 20 percent.

This particular one, this contract, a competitive contract was won by General Motors in July 1982. The fiscal year 1984 average program cost is $12,500 and the jeep if procured this year would cost us over $17,000 which is quite a shocker when you think of the old jeep.

Since I came in, the jeep it has changed quite a bit. This vehicle which we will buy and which will replace over half of the light vehicle fleet is about $5,000 cheaper.

Senator GOLDWATER. That is a commercially available vehicle?

General MERRYMAN. Yes. However, you could not walk in a Chevrolet storeroom or a dealer and order the vehicle. He would not have now this vehicle on the floor because there are some things that the military had added such as markers, like the paint, like the decals, blackout markers. Otherwise everything else is standard and is commercially available.

Senator GOLDWATER. $17,000 is a lot of money for that kind of vehicle.

General MERRYMAN. This vehicle is $12,500. The point I am making is that this 5/4-ton commercial vehicle is $12,500 and the ¼-ton jeep is $17,000. So we are saving money by buying this one.

CUCV HIGHLIGHTS

Fiscal year 1982 accomplishments: Procduction contract award.

Fiscal year 1983 status/plans: First article testing; begin Army fielding; 9th Inf. Div. Ft. Lewis, first unit to receive vehicles.

This tells you what we have done with the CUCV. We awarded a production contract to General Motors.

First article testing is taking place in Aberdeen right now. The Army gets 71 percent of the fiscal year 1982 buy, 96 percent of fiscal year 1983 buy and 87 percent of our 1984 buy. This is the costing stream for the CUCV.

CUCV FINANCIAL SUMMARY

	FY82	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	0	0	0	0	0	0
WPN SYS PROC	39.9	177.4	191.7	354.9	0	763.9
QUANTITY BUY	3033	13618	15346	24082	0	56079

$(000,000)

Those pictures are the four-body types we are buying. they are all the same except for the beds in the back.

Single-Channel Ground and Airborne Radio System (Sincgars)

Fiscal year 1984 RDT&E request $16.1 million.
Fiscal year 1984 weapons system procurement request $58.4 million.
Lightweight tactical radio.
Antijam, data, and secure voice.
3,200 in fiscal year 1984 request, 277,000 total buy.
Fiscal year 1984—2nd year of production.
650 systems procured through 1983 FDP.

SINCGARS

You remember the day before yesterday we were talking about buying systems that provide our soldiers capabilities to counter the Soviet threat. This is our new radio we are going to buy. What it does, sir, is to provide our soldiers with a capability of having radios that the enemy can't jam.

The radios we have today the enemy can jam. If you can't talk, you know the problems you get into in fighting a war.

Senator Goldwater. Will this be single-side band?

General Merryman. No, sir. This is not a side band. This is FM. It is VHF.

General Mason. Sir, it is essentially the same size as the VRC–12 which it replaces. It is that long and that high and so deep. You can buy it in modules.

Senator Goldwater. What does it weigh?

General Mason. Twenty pounds.

General Merryman. It is quite a bit lighter than the old one. The old one came in two versions, the version you have seen in a jeep, that is the one we have out there right now, is 42 pounds. The old back pack version is 27 pounds, the SINCGARS we are projecting at 14 pounds.

Let me tell you a few other things it has. The current radio has 920 channels. The new radio will have 2,320 channels. Through a process known as frequency hopping, you significantly decrease your vulnerability to jamming.

SINCGARS HIGHLIGHTS

Fiscal year 1982 accomplishments: Decision to accelerate IOC (fiscal year 1985), drop fast freq hop technology; developmental and operational testing continued.

Fiscal year 1983 status/plans: Decision to field system quicker; production decision—April 1983; source selection—May 1983; production contract—June 1983.

Senator **GOLDWATER**. Those are not crystal-control channels, are they?

General **MERRYMAN**. I don't know, sir. I can find out. It is tuneable, but I don't know if it is crystal or not.

Senator **GOLDWATER**. I wish you would find out if they require crystals. Do you know what the power output is approximately? Ten watts? Five watts?

General **MERRYMAN**. I had better get you that too, Senator.

[The information follows:]

SINGLE-CHANNEL GROUND AND AIRBORNE RADIO SYSTEM (SINCGARS)

Each channel does not have a crystal. The 2,320 separate channels are derived through a system crystal oscillator that has its output synthesized by a series of integrated circuits (IC). The accuracy and stability of each channel is subsequenty controlled by a Phase Locked Loop (PLL), comprised of IC's.

The SINCGARS power output is adjustable, but the nominal output is 5 watts for the manpack version and 50 watts for the vehicular, power-amplified version. Power levels in between the 5-50 watts are adjustable in discrete increments in order to provide only the minimum emission signature.

Senator **GOLDWATER**. That is a little bit bigger, I think, than I thought you would come up with. I thought you would get a small hand held unit. I think for battlefield use it is not exactly line of sight, but you could get 10 miles and they are not too expensive and anyone can put them in their hip pocket.

General **WAGNER**. We are buying those small ones for the infantry, sir. In our armour platoons, for example, we do not have to have one of these in every tank. We would rather have a cheaper, smaller radio with less range, and probably throw it away if it causes trouble.

The frequency hopping is good for jamming when the platoon leader has to talk to the company commander or battalion commander. When you are close together, the jamming is not a real problem.

Senator **GOLDWATER**. Who is making this for you?

General **MERRYMAN**. Cincinnati Electronics and the other one is ITT. Actually, it is the Aerospace Optical Division at ITT.

Senator **GOLDWATER**. I wish you would go to the side band.

General **MERRYMAN**. We have single side band also. One of the best things about this radio is that we are getting all that initial capability and the projected cost is only running a couple thousand dollars more than the current radio. We had been concerned that it would run considerably more than that.

Senator **GOLDWATER**. Do you know what the unit cost is on those?

General **MERRYMAN**. $14,450 is the average unit cost. That compares, for example, with the $12,000 for the current contract on the VRC-12.

Senator **GOLDWATER**. Is Rockwell bidding on this?

General **MERRYMAN**. They did originally. Up until the early part of last year there were three competitors. Rockwell was one of them. Rockwell was producing or developing a fast hop radio.

The other two were developing a slow hop. We had a big review in the Army and said we need to get on with something and field it. We found that the fast hop was higher risk than the slow hop and we found also, based on the threat, that the slow hop should take care of the threat and you didn't need the fast hop.

So, we changed our plans, sir, and went to the two slow hopping competitors.

SINCGARS FINANCIAL SUMMARY

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	80.4	16.9	16.1	5.7	18.0	137.1
WPN SYS PROC	0	20.7	58.4	158.4	3,848.5	4,086.0
QUANTITY BUY	0	650	3200	8250	264,900	277,000

$(000,000)

This is the financial summary. We have added money to our POM in order to buy these radios as fast as we can to save money and provide the troops with a jam-proof radio.

Position Location Reporting System (PLRS)

Fiscal year 1984 RDT&E request, $15.2 million.
Fiscal year 1984 weapons system procurement request, $43.5 million.
Joint Army/Marine Corps program.
Realtime location, ident., and navigation reporting for command and control.
1 master station/412 user units in fiscal year 1984 request.
11 master stations/2,064 user units total buy.
Fiscal year 1984—2nd year of production.
2 master stations/165 user units procured through fiscal year 1983 FDP.

POSITION LOCATION REPORTING SYSTEM

The last system I have to discuss with you today, sir, is the position location reporting system. It is a joint program with the Marines. What this does is, through one of these little devices like you were talking about, tell you where you are. It tells anybody out there in the system where you are.

Your are able to transmit a certain amount of data over it. This is our second year of production. We are going to field the first ones in the 9th Division.

The procurement dollars that I have in the chart up there buy 412 user units and one master station, and the R&D develops training aids and devices and system software used for automatic test work.

Senator Goldwater. The first test was at Yuma. That weighed about 28 pounds. Have you cut the weight down?

General Mason. We cut it down, sir. I can't tell you how much the backpack weighs at this time.

It is 25 pounds with the battery at this time.

Senator **Goldwater**. That is not much better. That small hand thing will tell you exactly how many meters you have walked and how far it is to where you are going and how far anything in the perimeter is from you. It gives every piece of information you want for battlefield travel, airfield direction, Air Force direction.

General **Merryman**. After the development of this system we are going to combine it with a thing called the joint tactical information distribution system [JTIDS] which the Air Force uses, into what we call a PLRS-JTIDS hybrid. The hybrid will provide our Army and Air Force a capability where everybody knows where everybody is to the extent where you can take a flight of helicopters and require no aircraft traffic control. This will tell you where you are supposed to go.

You know exactly where you are. So, you could be way up front and I could be in the rear. By using this you can weave a path through all kinds of jungle and everything else. It is fantastic.

Senator **Goldwater**. The test I observed was control of actual firing of the fighter pilot by the ground man.

General **Merryman**. Anybody who has ever seen combat knows that the problem you are talking about is the biggest one. That is you are never quite sure where you are. It seems that we all ought to be able to read maps, but if I had a dollar bill for every time I dropped in the wrong hole in Vietnam during my 2 years there as an aviator, you and I could have a pretty good dinner.

Senator **Levin**. I wonder if they could make some of those available to us to get around the office buildings?

General **Merryman**. We need some in the Pentagon, too, sir.

PLRS Highlights

Fiscal year 1982 accomplishments: Joint developmental and operational testing II completed—January 1982; reliability improvement contract awarded—March 1982; concept development at 9th Inf Div—April 1982 through May 1982; Army and Marine Corps approved PLRS for production.

Fiscal year 1983 status/plans: Production contract award planned—April 1983; additional concept development at 9th Inf Div—August 1983 through November 1983.

This shows you what we have done during the past year. We have finished the testing. Now, the original testing of this, of the PLRS showed we had some reliability, availability and maintainability [RAM] problems. We couldn't go as far between failures as we wanted to. We developed a reliability improvement program to increase its capability to 500 mean hours between failures. That program is on track and our experts are telling me that there is no reason in the world why I shouldn't believe that we are going to get there.

Last year at this time if you remember, we weren't quite sure because it was not making 500 hours. I don't think you and I had this conversation, but some people in the House had some concern.

Senator **Goldwater**. What does the unit cost?

General **Mason**. We have two costs. The user unit, that is the man-pack version in 1983 dollars is $34,600. That is the estimate.

The master station in 1983 dollars is $3,755,000.

Senator **Goldwater**. What was the last one?

General **Mason**. The master station.

Senator GOLDWATER. That has to be carried in a trailer, does it not?

General MERRYMAN. Yes. You have two of those in a division. You have several hundred of the smaller, the user unit.

General WAGNER. We looked at two master stations at Fort Lewis in testing. When the user units operate over long distances they run out of range and they could not get the data.

General MERRYMAN. We plan to go to contract award in April of this year and we plan to continue developing our concept for its use for the 9th Divison and 2d Marine Division, starting in August.

PLRS FINANCIAL SUMMARY

	FY82 & PRIOR	FY83	FY84	FY85	TO COMPLETE	TOTAL
RDT&E	53.6	12.7	15.2	16.2	2.4	100.2
WPN SYS PROC	0	28.2	43.5	87.0	67.8	226.5
QTY MASTER STAT.	0	2	1	6	2	11
QTY USER UNITS	0	165	412	687	800	2064

$(000,000)

This shows you the funding stream for PLRS, sir, and the number of master stations and user units. What I am showing you here is not the total program that I discussed with you a moment ago when we combined it with JTIDS.

This is pure PLRS. When we move ahead and combine it with the JTIDS which interfaces with the Air Force, then we will buy more of these. We are not asking for money for that this year. This is for this program.

That concludes the systems, sir, that you requested we brief you on.

I have just two final remarks, if I might.

PLRS/JTIDS COMPETITION

Senator LEVIN. What was the requirement in the contract with the developer on PLRS? How many hours between failures?

General MERRYMAN. My memory says 500, sir, and that is what they should make.

Senator LEVIN. Who assumed the financial risk of their not making it? Did the contractor take the risk or did the Government take the risk?

General MASON. We did, sir. Sir, it was an engineering development program. The Army and the Marine Corps entered it together, doing it as a joint program. The contract, my memory tells me, was with Hughes and it was a cost-plus contract, so the Government took that risk.

We have not signed the production contract. That was engineering development.

Senator LEVIN. On the production contract, is there more than one bidder? Will that be a competitive contract?

General **Merryman**. Sir, to the best of my knowledge, it will not be. The reason is that we don't have the technical data package that we could compete at this point.

General **Mason**. This initial buy, as General Merryman told you, would be from Hughes. Then we go to PLRS-JTIDS Hybrid which he explained to you. At that point, we would hope to have a technical data package and be able to compete.

Senator **Levin**. Are these all the PLRS that you are going to buy?

General **Merryman**. Yes, sir, PLRS.

Senator **Levin**. Will the PLRS-JTIDS Hybrid be competed?

General **Merryman**. I think the honest answer there is that we will have a TDP [technical data package] and it will be our intent to look at competition in everything. You have to have darned good reasons why something isn't competed. Before anything gets through Dr. Sculley or Secretary Marsh or Under Secretary Ambrose. Our plan would be to do as General Mason says, get a TDP and hopefully compete.

Senator **Levin**. We can assume next year that there will be competition for the Hybrid? No more pure PLRS next year?

General **Merryman**. We will take these pure PLRS and with slight modification we will turn them into what we call enhanced PLRS and fit it with JTIDS.

Senator **Levin**. Let me ask you again. We can assume next year we will have a competitive contract for a Hybrid and there won't be any more pure PLRS requested next year?

General **Merryman**. After the initial 4-year PLRS buy, you can expect to see that or us trying to explain why not.

Dr. **Sculley**. Next year, based on our estimate of where we are now, we would expect to come in with the request for $16.2 million for continued research, development, testing and engineering and a request for procurement of $87 million still, if you will, for the pure version of PLRS.

Senator **Levin**. Why should we not try to compete this? I am not that familiar with this particular system, Mr. Chairman. I am just using this as an example of the need for contract competition.

The Chairman noted the technical side of this. Forgive me if I am way off——

Senator **Goldwater**. I think you are right. This is not a simple system, but it is something where I think competition should be required.

Senator **Levin**. Why can't we get a technical data package on PLRS?

Dr. **Sculley**. It is in engineering development at this time. Ideally, I think if you had unconstrained resources at a point in time, it would be desirable to bring more than one contractor along in engineering development.

We have not always done that in the past for affordability reasons.

Senator **Levin**. This is procurement now, is it not?

Dr. **Sculley**. It is now, yes, sir, but we have only brought along the one contractor through the research and development and procurement until the technical data package is matured. On the other hand, I think the SINCGARS example is an example where we have brought two contractors, ITT and Cincinnati Electronics, along in the engineering development.

Senator **Levin**. How much would it cost to produce a TDP on this and how long would it take?

Dr. **Sculley**. I will be happy to provide that for the record, if I may.

Senator **Levin**. Could you put in the record how many of the components of PLRS are obtained by subcontract and how many of those are competed?

I don"t think you would have that answer today.

Dr. **Sculley**. No, but I will be happy to provide that. I can assure you that my continuing intention is to examine carefully the subcontractor and vendor base with our primes.

[The information follows.]

Position Location Reporting Systems (PLRS)

The fiscal year 1983 appropriation funded the first program year of a planned joint Army/Marine Corps 4-year multiyear production contract. A TDP will be procured and delivered to the Government at month 33 as part of the first program year requirement. If procured separately, those production efforts necessary to produce a TDP, plus the documentation, are conservatively estimated to cost in excess of $30 million.

The prime contractor plans to subcontract 72 percent of the PLRS hardware. Of this 72 percent, 94 component items represent 81 percent of the contract dollars—$61 million—to be spent for subcontracting. Nine component items are planned for sole source procurement and 85 will be procured through industrial competition.

Senator **Levin**. I know you are making an effort in that direction and I applaud it. It would be interesting to see how many of those subcontracts whatever the number—how many of those are competed.

As a matter of fact, you do not have a big incentive here, if you are the sole source provider, to compete the subcontracts. The profit will be more the more we pay them for a unit. The profit is based on percentage of cost.

So the cost for the user package, $32,000, if his costs are higher, he will make a higher profit. He does not have an incentive, if he does not have competition, to compete those subcontracts.

General **Merryman**. There is something we have not told you that you need to understand that will help you get a feel for where we are.

The ED that we are going to do right now, engineering development, is the result of competition. So it wasn't sole source. In other words, Hughes won the competition.

Senator **Goldwater**. Was this not a Hughes development that they offered to the Army? It seems to me that at the Yuma Test Center that is what I was told. It was not an Army request. Hughes developed it themselves.

General **Merryman**. I think Hughes did by Army and Marine Corps request.

There are two things I have not told you and my information is that they won the contract competitively.

The second thing, to answer your question, 13 percent of the PLRS type units will be built under the sole source. So you have 87 percent after what you saw up here yet to go.

Senator **Levin**. Does that 87 percent include the fiscal year 1985 buy?

Dr. **Sculley**. No, sir.

General **Merryman**. I can't tell you for sure about the numbers. I can tell you that what I have says 13 percent sole source. You have 87 percent left.

I don't know where that works into, which percent in terms of the year of purchase.

OPA [OTHER PROCUREMENT ARMY]

Sir, there are two other things I would like to offer. Your staff has requested that I provide to you for the record a statement on other procurement, Army, which your committee now is also responsible for. I have done that.

[Note.—This statement can be found at the end of testimony after the supplemental questions and answers for the record.]

The second thing is to draw your attention to the weapon systems handbook which is here in addition to this book which was our full statement.

I am sure you have seen this book before. What we have done here is to provide you a picture of a system and everything unclassified we can tell you on the other sheet to let you know what it is and why we need it.

Those have been provided to each of the members. That is all I have, sir.

Senator **Goldwater**. Any more questions?

Senator **Levin**. I have some questions on some of the items raised earlier.

DIVAD GUN

First, on DIVAD I have some questions relating to that. I understand that it has had some deficiencies and that the first test of the prototype had to be canceled.

GAO reports we have had some problems with that gun. It has not met requirements in two or three areas, including fire control mean time between failures, gun mean round between failures and the graphic display unit.

Is it true that the Army testified before the House Armed Services Committee that DIVAD was a marginal system or very close to being marginal?

General **Merryman**. That was a comment that the Chief of Staff made, sir.

Senator **Levin**. I'm sorry I did not hear you.

General **Merryman**. That is a comment that I was informed that our Chief of Staff made. He did not mean by that comment that the gun was marginal because of the performance.

What he was trying to explain at the time was that we need a lot of things and everything is not as important to us as the M1.

He would tell you if he were stitting here that we desperately need the DIVAD gun. Today we have a gun that shoots 1,200 meters, and as you know, it is a joke.

We need something that can shoot farther, which the DIVAD can, [deleted] and find something in the heat of war where you have that smoke and noise. The DIVAD with its radar and with its rounds is a very effective weapon.

What the Chief was trying to talk about there is the fact that every time we start looking for dollars, as often as not when OSD says what can the Army cut, DIVAD shows up. The Army does not want to cut DIVAD and needs it in the worst way. It had nothing to do with the performance of the gun.

Senator LEVIN. Is it marginl performance or marginal need? I don't quite understand.

General MERRYMAN. His comment pertained strictly to where it lies in the perception of requirements.

Senator LEVIN. Priorities?

General MERRYMAN. Yes, sir. It had nothing to do with the performance of the system.

Senator LEVIN. Although the Army wants it, it gives it lower priority to some other items?

General MERRYMAN. Yes, sir. But I would like to explain. You weren't here, sir, Tuesday when I was asked the same question If I might explain our dilemma, you see the tank is priority No. 1, radios and your trucks are probably priorities 98 or 99. You can't fight a war with all priority No. 1's. You have to have priorities 98 and 99 and DIVAD is somewhere between 98 and 99 and No. 1.

You are not going to live very long on the battlefield without something to keep the enemy aircraft off your back. That is why it is not as clean as saying you can just buy all of priority one items and no lower priority items.

Senator LEVIN. I gather there will be some new tests on DIVAD. Why should we not hold off funding this until we can see whether or not it meets your requirement.

General MERRYMAN. You are in your third year of production with the 1984 funds. You have a fixed-price contract and if you didn't fund it, sir, and if we didn't go ahead, as I recall, it would blow the contracts.

Senator LEVIN. It would what?

General MERRYMAN. In other words, we couldn't continue with the contracts which we have negotiated. What we would end up doing, sir, is if we restarted the program, it would cost you a lot more than what it is going to cost you right now.

Senator LEVIN. When will these tests be completed?

General MERRYMAN. We are going to do some testing this year on the gun system and turret, the gun feed system and turret, and on all the problems, as a matter of fact, that we found last year.

Senator LEVIN. When will we know whether it will meet those requirements or not?

General WAGNER. The first production delivery is scheduled for September. That first unit equipped will test them to see if the fixes have been made that the engineering analysis says should be corrected.

Senator LEVIN. If they don't?

General WAGNER. If they do not, we will have to either correct them or slow down the production until they correct them.

Senator LEVIN. How long after September?

General MERRYMAN. I can't tell you the exact time of the test.

Senator **Levin**. Will they continue to produce them while you are going through those tests?

General **Merryman**. Yes, sir.

Senator **Levin**. Why will you be producing something that you don't know meets the standard?

General **Merryman**. A thorough engineering analysis to include the independent test community which first brought it to our attention and raised the question on it, said the fixes that are required appeared to be simple enough and that there should not be difficulty doing it during initial production.

Senator **Levin**. You are confident they will meet the test?

General **Merryman**. Yes, sir. It has gone through a thorough scrub by several independent units in the Army which were looking at it very hard. We were briefed last week and convinced some of the doubters it could be done.

Senator **Levin**. I understand the requirement for mean time between failures of the fire control system was twice as high at least as what was demonstrated.

Is that accurate? You demonstrated 53 hours in the least and a minimum of 95 hours is required in the mean time between failures?

General **Pihl**. It is fair to point out to the committee there are two prototypes for DIVAD, one kept at the factory and the other one used to test. We are looking to the first article production to run it through the first article test. In the meantime, much analogous to what General Drenz showed the other day on the AH-64, the DIVAD is in production.

As the subassemblies are built, we will run component tests on those. By the time the vehicle is finally integrated we will be able to run our OT evaluation.

Senator **Levin**. Did the independent test community recommend against exercising the option that we exercised in May 1983 until after the test was completed on production unit?

Dr. **Sculley**. I will have to provide that for the record, sir.

[The information follows:]

DIVAD

Dr. **Sculley**. The test agencies have not recommended against exercising the production option scheduled for May 1983. They have expressed their concerns over some of the test results and the overall limited testing to which this program has been subjected. The DIVAD acquisition strategy called for accelerated development and as a byproduct some concurrency between testing and production. The test agencies have looked closely at DIVAD testing and supported the decision to enter production. We have increased our testing early in production, partially as a response to concerns which they have raised. We are confident that the system will meet its performance requirements when production units are tested.

Senator **Levin**. One other question on DIVAD requirements.

I understand that the mean rounds between failures of the gun is supposed to be 2,000 and 4,000 rounds—a minimum of 2,000—and it has only demonstrated 365 rounds between failures.

Is that true?

General **Merryman**. I can't tell you if that is precisely correct. One of the problems with the gun feed system that we discussed Tuesday and we pointed out today, one of the problems is that we made the mistake of having to use an old worn-out prototype.

Senator **Levin**. Please supply that for the record.

[The information follows:]

DIVAD

General **Merryman**. The DIVAD contract requires that the system demonstrate 1,700 mean rounds between failures during initial production testing. This testing is scheduled to begin in March 1984. It is true that we have had some difficulty with the armament system reliability and in one of our tests we did achieve only 365 mean rounds between failures. This is not reflective of what the system will achieve in the production configurations. The low figure achieved in the last test is a result of the fact that we have designed a new feed system for production and that new feed system was not incorporated in the prototype which was tested. We are confident that the new feed system will allow us to achieve the required 1,700 mean rounds between failure. The DIVAD contract also adds to our overall confidence that failure rates will be low. The contractor must deliver a production system which meets our performance specifications or retrofit the system at his expense.

Senator **Levin**. I understand that the test was held a year after the award of the DIVAD production contract?

Dr. **Sculley**. That is correct.

Senator **Levin**. So the contractor was not able to meet the requirements even after a year of work on the production contract?

Dr. **Sculley**. I think it is fair here, sir, again to emphasize that it is a single system that was being evaluated and also mention the results of earlier testing that this system went through when in fact the contractor won a competition and did meet the stated requirements. But I will be happy to amplify this for the record.

[The information follows:]

DIVAD

Dr. **Sculley**. The reliability test was started in June 1982. Although Ford Aerospace was chosen in May 1981, as the prime contractor, the first year of their contract was spent facilitizing for production, completing research and development and procuring long lead items. The first production contract to procure systems was signed in May 1982. The system which was tested at Aberdeen Proving Ground in May 1982, was a prototype system which has been subjected to testing for over 2 years. Our first production unit is not scheduled for delivery until September 1983. Therefore, testing of the prototype began during the competitive development prior to the award of the production contract and not 1 year after.

Senator **Levin**. Who took the financial risk of this contract not meeting the requirement, the contractor or the Government?

Dr. **Sculley**. The contractor, sir.

We are on, and I think it is fair to point out we are on a fixed-price incentive contract. So it would be correct to say that we shared the risk between the target cost and the ceiling, but after the ceiling the risk is the contractor's.

Senator **Levin**. I am talking about the risk of not meeting the requirement. If he produces 50 DIVAD and they don't meet requirements, you have to go back and produce another 50 that do.

Dr. **Sculley**. That is in the contract. That is his risk, sir.

Senator **Levin**. We are proceeding with production at their risk? If they don't meet the requirement, then it does not cost us anything, is that right?

Dr. **Sculley**. That is correct, sir, to the ceiling.

Senator **Levin**. What is the difference between the floor and the ceiling cost-wise?

Dr. **Sculley**. We have a target price that we aim toward. There is a ceiling. That between the target and ceiling is shared between the Government and the contractor.

Senator **Levin**. Can you tell us the difference between the target price and ceiling price?

Dr. **Sculley**. I think that first option is $60 million difference between target and ceiling.

Senator **Levin**. Can you give us the target and ceiling figures?

Dr. **Sculley**. Again, I will be happy to provide that.

[The information follows:]

DIVAD

Dr. Sculley. The contract with Ford Aerospace has a base contract and three production options. The target and ceiling figures for those contracts are shown below:

[In millions]

	Base year	Option 1	Option 2	Option 3
Target	$193.2	$336.2	$396.9	$533.0
Ceiling	237.1	413.3	469.6	606.3

Senator **Levin**. I thought the difference between the target and ceiling related to the cost rather than to failure to meet requirements.

If something costs them more because of labor cost or inflation, that is one thing. If something costs them more because their product has not met the specifications, which they guaranteed, I wonder why we should share that at all.

Dr. **Sculley**. It has been traditional that risk is burdened entirely on the Government in cost-plus contracts. It has been traditional that it is shared in fixed price incentive contracts and it has been traditional in firm fixed price contracts that the risk is entirely on the contractor. I will tell you, I think you could probably negotiate a firm fixed price contract where the entire burden would be on the contractor, but at the same time I would expect that negotiated firm fixed price contracts could result in a higher cost to the Government.

It is a calculated decision as to what the proper contractual instrument is.

Senator **Levin**. Mr. Chairman, I have a question on some other systems, but I don't want to take up all the time.

Senator **Goldwater**. You may continue. This is their last appearance.

Do you have some questions?

Senator **Bingaman**. I have a couple questions, Mr. Chairman. Thank you.

BRADLEY FIGHTING VEHICLE/AIFV

Let me just ask a question about the Bradley fighting vehicle if I could.

I have heard it suggested that perhaps it would have made some sense for us to buy the armored infantry fighting vehicle rather than the Bradley fighting vehicle, at least in some quantities. That is the alternative that the Dutch had been buying in this country and it would have made sense for the Army to do the same thing.

Could I get your response on that?

General PIHL. Yes, sir. The armored infantry fighting vehicle is a M–113 derivative with a one-man turret, 25-millimeter gun with a 7.62mm coaxial machinegun. If you up-armored the M–113 to the AIFV, you would have the M–113 with a turret on top of it, and a single position nonstabilized gun. You would not have, as compared to the Bradley, the two-position TOW launcher, you would not have firing port weapons, and you would not have the mobility that the Bradley offers. So it is a basic M–113 with a turret on top of it, single 25 millimeter gun.

Senator BINGAMAN. Could you indicate whether the Army has seriously considered purchase of these rather than the Bradley fighting vehicle in some quantities at least?

General PIHL. Yes, sir. The suggestion was made that you could produce two AIFVs for the price of a Bradley. Actually when you up-armor the turret on an AIFV, the cost becomes $650,000 per copy as compared to the cost of the Bradley fighting vehicle of $1.2 million in constant 1984 dollars.

So it starts to become very close. Indeed you cannot buy two AIFVs for the price of one Bradley.

Senator BINGAMAN. I guess it is your view then that the cost savings are not justified because of the reduced capability of the weapon, is that correct?

General PIHL. That is correct, Senator.

General WAGNER. Sir, as an Army user, I would like to comment on that a bit.

Putting the turret on the M–113 still gives you only little more than a battle taxi. That is all we have had for the last 20 years. You are not getting any more protection for the individuals inside there. The mobility is far below the mobility of the Bradley to move about the battlefield. It cannot be used very effectively in a reconnaissance role because if it runs into a tank, it has nothing to fight it with without the TOW system on it.

The Bradley is a fighting vehicle. The AIFV, while it is called a fighting vehicle, is nothing more than putting a bigger gun on the M–113. You are not giving any more protection to those individuals inside.

There have been a number of analyses run over the years to determine whether it was cost effective to go to the Bradley. Everyone said ~~that~~ is the way to go and it gives you a substantial increase in capabilities on the battlefield.

PATRIOT

Senator BINGAMAN. Let me ask about the Patriot also, if I could, Mr. Chairman.

I was wondering what the problems are. I have heard several reports about problems with the software that is used with the Patriot, that some way or other it has difficulty distinguishing between aircraft when they are in close quarters.

Can somebody describe the nature of that difficulty and whether it still exists or whether those reports are exaggerated?

General **Merryman**. I don't know of any current software problems that you spoke of. I think what you referred to are some problems that did exist. The information I have is that the software has met the criteria laid down by OSD for follow-on tests which I discussed earlier, tests that we just finished completing.

Let me check to make sure.

General Pihl?

General **Pihl**. That is correct, sir.

Senator **Bingaman**. Let me ask about the number of missiles that we are purchasing for each Patriot.

Do you have that information available?

General **Merryman**. We are buying a total number of 6,217 missiles, sir, and 103 fire units.

Senator **Bingaman**. Sixty missiles per fire unit?

General **Pihl**. Patriot has 8 launchers and 64 missiles per fire unit.

Senator **Bingaman**. In your opinion, is that an adequate number of missiles to justify the purchase of those fire units? Are we going to be very short on missiles as compared to firing units as you would see it?

General **Merryman**. I think the only honest answer to that, sir, is that the number that we decided to buy like everything else, had to be based on a judgment of all it is you have to take to fight a war if it starts. If you ask me do you have enough of any one thing, my honest answer would be no.

In other words, we probably ought to have more. We ought to have more tanks. When you have 11,000 tanks and they have 50,000 tanks, 11,000 is not enough.

Senator **Bingaman**. You think the relative number of missiles to firing units is appropriate?

General **Merryman**. Considering all the other things that the Army needs for a balanced war-fighting capability, sir. Those are not just meaningless words. I am trying to give it to you straight to point out that you need some of all of these things because you don't know where they are going to hit you or what they are going to hit you with.

MULTIPLE LAUNCH ROCKET SYSTEM

Senator **Bingaman**. Let me also ask one more question, Mr. Chairman, about the multiple launch rocket system.

I think there is a picture of it on page 36 of what you have provided us with in your booklet. I was wondering how long the ammunition would be expected to last with that particular rocket system? Do we have an idea there as to the amount of ammunition we have compared to the system itself, whether that is appropriate?

General **Merryman**. I can give you the answer to the question. The number of rounds was based on the same rationale as the Patriot. I am sure we need more than what we are asking for, but it is all that we can afford to ask you for, given the other things we must have.

Senator **Bingaman**. Do you have any estimate timewise as to how long the ammunition would last that we do have available for those units?

General **Merryman**. I can get you that. I am sure you know we didn't just grab the number. The number was based on some rationale and I am not sure what that is.

General **Wagner**. It is an ammunition item. Like all ammunition items, we have a number of rounds that we estimate we will need for 15, 30, 45, 60, or 90 days. Our goal is to build up to a minimum of [deleted]. It will probably take [deleted] or so to do that at a minimum.

Senator **Bingaman**. You could get me the figures as to how long a period you would be able to fire under present requests?

General **Merryman**. As I understand it, you want to know if in our 5-year program we have laid out how many days of supply we would have at the end of 5 years. Is that what you are looking for?

Senator **Bingaman**. I am really looking for it on an annual basis. I would like to know this year if we were going to go ahead with what you are requesting this year—what would that leave us with at the end of the year.

[The information follows:]

MULTIPLE-LAUNCH ROCKET SYSTEM (MLRS)

Procurement funding in fiscal year 1984 will not show up as an end-of-year inventory increase due to production lead times. Projected inventory for tactical rockets and launchers at the end of each year of the Five Year Defense Plan (FYDP) period are:

	Fiscal year				
	1984	1985	1986	1987	1988
Rockets	12,114	39,486	79,068	137,970	209,544
Launchers	130	204	272	320	333

Senator **Bingaman**. Thank you, Mr. Chairman.

Senator **Goldwater**. I think it might also be interesting to know how many times you could fire the system, in other words, with one load of ammunition? Can you fire it once, twice? How many times?

General **Wagner**. You can fire it from 1 to 12 times depending on whether you fire ripple fire, salvo, or single shot.

Senator **Goldwater**. Then you are through?

General **Wagner**. Then you have to reload the pod.

General **Merryman**. The pods come with six missiles each.

Senator **Goldwater**. Do they carry extra ammunition or are they in a trailer?

General **Merryman**. Ten-ton with a ten-ton trailer with its own crane so that it can load it on the launcher system. Those are being procured so that it will be fielded when it goes to Europe with those systems.

Senator **Goldwater**. Senator Kennedy?

Senator **Kennedy**. Thank you, Mr. Chairman.

I was here a few days ago when we were beginning these hearings, but I didn't have a chance to ask a more general question. In your report you state that the Army's objective is to retain the technological superiority which we have, regain it where we have lost it, and exploit it to the maximum combat effectiveness.

Could you tell us a little about in what you think we are currently superior in fulfilling our mission with specific weapon systems? I ask, for example, whether or not our antitank capability is superior to the Soviet? Can you give us some guidelines?

UNITED STATES/SOVIET TECHNOLOGICAL SUPERIORITY

General **MERRYMAN**. The only area we rate ourselves as close to parity to the Soviet is in the field artillery. I am talking about what is fielded now, what is out there now. DIA, CIA, and our operational analysts rate them as having a superior capability in all other respects.

[Deleted.]

Their missiles are superior to ours. They have fielded today, for example, the BMP's which is their vehicle comparable to our Bradley fighting vehicle. We have just started the Bradley production. We have produced less than 300.

Senator **KENNEDY**. How does theirs differ? Could you continue with your comments about areas where you think they are ahead of us and where we are ahead of them?

General **MERRYMAN**. I talked about the tanks, Senator. In field artillery rockets, we have no rockets; MLRS is something we are getting ready to field. The Soviets have the BMP and we have yet to field our IFV. They are ahead of us in air defense systems. We have yet to field our Patriot. They are ahead of us in air-defense guns.

We have yet to field our DIVAD. They have the ZSU-23 which they have had for some time. They have superior antitank guided missiles. Now they will not enjoy that edge once we get TOW II out in the field.

As for attack helicopters, they have the HIND helicopter and some HIP helicopters that are far superior to our current Cobra attack helicopters.

In their surface-to-surface missiles, they are far superior in that they have SS-20's, SS-21's, SS-22's, and SS-23's.

What we are trying to do is to field systems that will make it at least even and, where possible, better. We will do that with the M1 as far as the tank is concerned. We will do that as far as the rockets are concerned with the MLRS. Our Bradley will be better than anything they have. Patriot will be better than anything they have. DIVAD will be more than a match with their air-defense guns. TOW II and Hellfire missiles will be better than what they have for antitank guided missiles.

The AH-64 will provide a better attack helicopter. Our Pershing II will provide us with a better surface-to-surface missile, once we get those fielded.

If we went to war tomorrow, they not only outnumber us, but most of what they have as equipment is better. By the late eighties that will not be so, unless they surprise us and field some stuff we don't know about.

Senator **Kennedy**. In what areas would you say we are ahead of them?

General **Merryman**. None.

General **Wagner**. Sir, there is a technological area——

Senator **Kennedy**. Except in the quality and dedication of the military manpower and American soldier.

General **Wagner**. Night vision equipment, the FLIR which we do have on our M-60A3 tank TOW launchers. That gives us a tremendous capability at night which they do not have. We are training hard to be able to exploit that advantage.

Senator **Kennedy**. What would you say about your own intelligence? Should we expect that they will leap-frog us in any of these weapon systems you now are requesting? In what particular areas does your intelligence indicate that they may be making some particular priority? Is there a possibility that they will move ahead of us?

General **Wagner**. [Deleted.] We are very worried about that right now because you can knock out the [deleted].

If I worried about a single thing on the battlefield and the infantryman and tanker worried about it, it would be leapfrogging in laser technology.

General **Merryman**. We are worried about their recent progress in the tank. They are just fielding now the T-80 which we mentioned on Tuesday. If they run true to form, they will be fielding an improved version in just a few years.

Senator **Kennedy**. That raises questions of whether it is the goal of the Army to fight Soviet tanks with our tanks or fight their tanks with antitank weapons and, if so, how does that balance work out?

General **Wagner**. It is a synergistic effect, sir. A tank is one of our best tank killers, no doubt. If you use in combination our missiles that the infantry has, tank guns that our tankers have and helicopters and use them to tactical advantage so that you engage them simultaneously with a mix of weapons, it makes it much more difficult for them.

That is the reason we teach tactically how to use those in a combined arms fashion so that they cannot design to only defeat one of our systems.

A bottom attack with our FASCAM mines gives us a tremendous advantage today to shape the battlefield and fight them where we want them.

So it takes a combination of all of those. In fact, there is a major study that is going on in our training and Doctrine Command right now to determine what is the synergistic effect among all of those weapon systems to help us to get a better handle on how many to buy. We are cranking in the Air Force too, because they need to kill tanks. You guess a lot as to what you are going to really need.

Senator **Kennedy**. What would you say in your evaluation then? You have given me a response to particular weapon systems and to what the Army request is now to upgrade current systems.

What is your basic evaluation of the tactical situation today of our field capability vis-a-vis the Soviet Union in Central Europe, given the numbers of tanks and antitank weapons that we have, and our ability to use tactical air support?

How does that balance? We have seen lists indicating that the Soviets have *x* number of tanks, and we have *y* number of tanks. I believe that what you are suggesting is that we have to look at numbers with some perspective as to the weapons' range, the other kinds of weapons that are available, and the synergistic effect of the use of those weapons vis-a-vis the capability of the Soviet Union.

What I am interested in is some sort of a whole field comparison.

General **WAGNER**. I visited the divisions in Europe recently to see their status of training, whether they were trained properly in the United States, and so forth.

I think with the troops on the ground in Europe today we can handle the threat of 3-to-1 in the early days of the war. If they continue to come at us with the number of divisions they have and we cannot reinforce rapidly enough with our divisions in the United States, we can't hold out forever.

I just read in the newspapers that General Kroesen recently said that our divisions are very well trained. I have been in Europe several times and its the best training I have ever seen in 25 years. But we can't hold out forever if they come at us with more and more follow-on units.

Senator **KENNEDY**. Thirty-two years ago when I was over there they were well trained, too.

General **WAGNER**. I was there in the mid-fifties and they are much better trained today.

Senator **KENNEDY**. You talk about certain weapon systems in which they are ahead, systems for which you are requesting funds in order to bring us up to speed with their capability. I suppose there are other weapon systems that we have that they don't have. How does the mix add to our field capability?

General **WAGNER**. I would say one other system with which we probably have an advantage is improved conventional munition (ICM) for the field artillery. Intelligence reports indicate that they are coming out with improved munitions, but I don't know the details of that yet. That does give us greater capability in that area.

Their basic machine counters everything we have in greater numbers.

Senator **KENNEDY**. Would you say that they are superior to us across the board, in the total range and mix of weapons systems?

General **WAGNER**. I wouldn't say every one of theirs is superior in capability. When you add their greater numbers and if they are near par in capability, the total effect is that they have the advantage.

General **MERRYMAN**. I don't think that is true as far as your aircraft in the Air Force. I don't think it is true as far as ships.

Senator **KENNEDY**. I was thinking of the Army. Obviously they have greater capability.

General **MERRYMAN**. In the early sixties we went to war in Vietnam. When that war started we were facing a horse-drawn, walking Russian Army. The day when the war ended they had mechanized. We found ourselves not only facing the same numbers, the same size, but with systems that for the most part exceeded the capability of what we had because we didn't do anything in Vietnam during those years except fight that war.

Senator KENNEDY. I have just a few other questions. I don't want to delay the hearing if you have other witnesses.

Senator GOLDWATER. Go ahead.

PERSHING/ATM

Senator KENNEDY. Regarding the Pershing II. It seems to me that this missile would be a primary target during a tactical war in Europe. If that is true, how useful would it be in a wartime situation?

General MERRYMAN. It would be a target. That is why we have asked you for money this year for an anti-tactical missile (ATMs) to start a program that would hopefully take care of that threat. It is a new program. What it would do is modify the Patriot missile, to look into what needs to be done to the Hawk missile, and to determine what needs to be done additionally to take care of the threat you are talking about because you are right on. If I were there, that is one of the first things I would target. I would target Pershing and I would target Patriot. We are worried about that because, as you know, they have that capability now with several missiles.

Senator KENNEDY. How long will it be before we are able to defend them effectively?

General MERRYMAN. There is one thing that you have to remember that Pershing has going for it that some of the other systems don't and that is that the only time that the other side really has a good chance of getting it would be if they started a surprise war and they knew exactly where it was.

This is because Pershing is mobile. Unless they have some way to target it or somebody telling them where it is going, they are not going to know where it is. All our intelligence sources lead us to believe that we will have at least a day or two warning in advance of anything that might happen over there.

Senator KENNEDY. I suppose that in a conventional war we might be able to determine, from the time they begin to move certain kinds of equipment, if they are going to pose a realistic challenge. But if they view this weapon system as dangerous, as apparently they do, I would image that they would recognize such when beginning to assemble various units. Obviously you would be taking counteractions to make it more difficult for the Soviets to employ different methods by which they might try to destroy the Pershing II's.

How does the Pershing II fit into the airland battle doctrine?

General MERRYMAN. It extends the range of the current Pershing from [deleted] to 1,800, which gives the theater commander a significantly greater capability to obviously shoot farther and influence what happens back to those distances. Right now [deleted] is as far as we can shoot with the Pershing I. When you talk of see deep, look deep and shoot deep——

Senator KENNEDY. If you were a Soviet military commander and you knew of the capability of the Pershing missiles and realize as you begin assembling various equipments, that you are tipping the

West off and encouraging the West to take steps to protect the Pershings, would you recommend a surprise attack?

Wouldn't that make more sense if you were a Russian?

General **Merryman**. That is true. If I were going to go to war and I wanted to be sure I got them before we had a chance to shoot them, that is about the only way you could have a high probabilty of getting the Pershing. Because once we get any indication they will be moving, they won't stay anywhere for any length of time.

General **Wagner**. In peacetime the units have certain ones that move all the time. As the crisis situation arises, more of them move out until they are all moving constantly so that they can't target them with a surprise attack.

When you ask about the AirLand Battle, the Pershing is a theater system and plays a part in the theater battle. They go after theater targets rather than the second echelon I was talking about.

Senator **Kennedy**. I have some other questions that I would like to submit to be answered for the record.

Senator **Goldwater**. Go ahead, Senator Levin.

Senator **Levin**. Thank you, Mr. Chairman.

I understand from the answer to Senator Kennedy's questions that these equations you are talking about do not include our allies, is that correct?

General **Merryman**. They do not. However, had I included our allies, I think it would have been essentially the same. We compare them two different ways. Sometimes we talk United States-Soviet, sometimes we talk Warsaw Pact-NATO.

Senator **Levin**. Your particular answers were us versus the Soviets?

SOVIET/UNITED STATES RATIOS OF EQUIPMENT/TROOPS

General **Merryman**. Correct.

General **Wagner**. The 3-to-1 I was talking about are the troops in Europe including the allies. For example, in the U.S. 7th Army we have German divisions during a conflict. I am counting total requirement of what we would have to counter initially in the war.

Senator **Levin**. You were talking about the total number of troops. You never gave us a troop comparison, did you?

General **Wagner**. Not specifically, no, sir.

Senator **Levin**. Do you know what that figure is for NATO versus Warsaw Pact offhand?

Dr. **Sculley**. Yes, sir. The U.S.-NATO is 1 million eventually and 3.7 million NATO versus 1.3 for the U.S.S.R. and 2.2 for the Pact at M-plus 100.

Senator **Levin**. Do we and our allies have more antitank guided missiles, for instance, than the Soviet Union and their allies?

General **Wagner**. No, sir.

Senator **Levin**. You think they have more?

General **Wagner**. Yes, sir.

Senator **Levin**. The Warsaw Pact has more antitank guided missiles than we do?

General **Wagner**. Yes, sir.

Senator **Levin**. If you could supply those figures for the record, it will be helpful.

[The information follows:]

QUANTITATIVE COMPARISON OF ANTITANK GUIDED MISSILES

The Warsaw Pact countries have approximately 24,300 Anti-tank guided missile launchers readily available for a Europen Theater conflict. The NATO countries have approximately 8,100 in Europe.

Senator **LEVIN**. Mr. Chairman, it might be useful since there was a reference to General Kroesen' statement here defending Europe that the statement be made part of the record. I would ask that that statement be made part of the record.

Perhaps the Army can supply it. I just got a report of it in the Baltimore Sun. I think it is an important statement. It indicates there are some areas we obviously have to become stronger in, but indicating how disappointed he is at the talk about the overwhelming Soviet conventional strength, being quoted as saying we can defend the border of Western Europe with what we have

What he really emphasized is the reinforcement question. That is an area that I think we ought to look at carefully.

[The information follows:]

GENERAL KROESEN'S STATEMENT

The Baltimore Sun article covering the interview with General Kroesen is attached.

[From the Baltimore Sun, Mar. 6, 1983]

GENERAL SAYS NATO IS ABLE TO DEFEND EUROPE

(By Charles W. Corddry)

HEIDELBERG, WEST GERMANY.—"It disappoints me," says Gen. Frederick J. Kroesen, "to hear people talk about the overwhelming Soviet conventional military strength.

"We can defend the borders of Western Europe with what we have. I've never asked for a larger force. I do not think that conventional [non-nuclear] defense is anywhere near hopeless."

General Kroesen, who just turned 60 and has been a soldier for 40 years, is commander of the U.S. Army in Europe and also heads the North Atlantic Treaty Organization's Central Army Group of U.S., West German and Canadian forces.

He, therefore, has major responsibility for the ground defense of about half of West Germany (the other half being defended by the Northern Army Group under a British commander) and can hardly afford to be casual in calculating the prospect.

The general was interviewed at his headquarters here at a time of great debate on the adequacy of West European defense and the extent to which the alliance would have to rely on early use of nuclear weapons to meet an attack by numerically superior Warsaw Pact conventional forces.

It is also a time of unprecedented modernization of the U.S. Army, thanks to the Reagan administration's enormous increases in defense money.

The ground force in which General Kroesen has such confidence is fielding 400 separate items of new equipment, from the agile and speedy M-1 Abrams tank to anti-aircraft missiles, attack helicopters, rocket launchers and on through to satellite communications systems and squad radios.

When the general clamly expresses his convictions about non-nuclear defense, it is against this background of increasing power—though not of size—in the U.S. Army in Europe, also called the 7th Army. For the present its strength is to remain at about 200,000, organized mainly in four combat divisions and three separate brigades. His words also show confidence in the West German and small Canadian ground forces that would come under the U.S. Army commander in time of war.

"We have the power in the Central Army Group to initiate the defense of Western Europe, General Kroesen says. "I'm very confident of our ability to do that."

The key word there is "initiate." General Kroesen has no illusions about what would happen to his forces, under attack, if swift reinforcements failed to come from the United States. By swift is meant a very few days, with the troops of six U.S.-

based Army divisions arriving by air and moving promptly into battle with combat equipment already stored in Western Europe.

Without fast reinforcement, "it would be a Bataan," the general said, alluding to the stranding of American troops and their surrender to Japanese forces in the Philippines early in World War II.

In referring to reinforcement necessities, General Kroesen touched on a problem that has caused friction with two allies, Belgium and the Netherlands, and worrry for the NATO military commander, U.S. Gen. Bernard W. Rogers.

Equipment for four U.S.-based divisions is stored in West Germany so that General Kroesen presumably could count on early reinforcement in his area. Under U.S. prodding, Belgium and the Netherlands took the politically unpopular step of acquiring scarce land and starting construction of storage facilities for equipment for the other two divisions.

But in final action on the current defense budget, Congress refused funds for storing the two sets of equipment. General Rogers says such action undermines efforts to get allies "to play their proper role."

Worse, the allied commander says, the United States cannot hope to meet its goal of having 10 divisions in Europe by D-day unless it stores the planned equipment in Belgium and the Netherlands.

"Without this minimal force [the reinforcing American divisions], the relative capability of the Warsaw Pact in the North German plain would be so overwhelmingly that we could not defend successfully without early use of nuclear weapons," General Rogers contends.

General Kroesen picks no bone with his superior American officer on the matter of nuclear use. NATO commanders are of one mind that the shadow of the nuclear weapon and Soviet uncertainty about when it would come into play are the ultimate deterrent to attack.

Ability to defend conventionally increases the deterrent's credibility, by this judgment, and in the end could force on the Soviet Union itself a decision whether to desist or to raise the stakes to nuclear use.

General Kroesen's estimates proceed from the assumption that promised reinforcements will arrive, that existing war reserve materiel (ammunition, weapons, fuel, rations . . . the gamut) would sustain battle for 30 days and that new organizations and tactics will confer great advantages.

"Given good generals, we are not outnumbered too much to win," he says. There are natural advantages that can be exploited in defending Central Europe. He estimates that the Russians and their allies could muster three divisions to his one. He does not see that as an awesome advantage, given the powerful new weapons, trained personnel and fast reaction times of his forces.

"At 3-to-1," the general says, "we ought to be able to keep from losing."

PATRIOT CONTRACT

Senator LEVIN. I have some questions on the Patriot air defense system, Mr. Chairman. I understand we have had some problems with that system. It is way behind schedule. It has production problems. It has difficulties with its built-in test equipment for one thing.

Who takes the risk of that failure?

General MERRYMAN. I will have to provide that for the record.

Senator LEVIN. Do you know whether that is a cost-plus contract or not, the Patriot air defense system?

General MERRYMAN. We will have to give it to you for the record.

[The information follows:]

PATRIOT

General MERRYMAN. During Patriot's early production, fiscal years 1980 through 1982 cost-plus incentive type contracts were used. The reasons for this were the requirement for additional testing, lack of program stability, and the need for more realistic historical cost data sufficient for estimating the probable cost of performance under a fixed price type contract. In addition, a Government accepted technical data package (TDP) was not available to establish a system baseline from which a fixed price contract could be negotiated. The Government accepted the TDP in early 1983; is using a fixed price incentive contract for fiscal year 1983; a firm fixed price contract for fiscal year 1984; and investigating the use of multi-year contracting for fiscal years 1985 through 1987. Under a cost-plus type contract the contractor does risk a portion of target fee based on the share line ratio to any overrun.

TRAINING OF PERSONNEL FOR PATRIOT

Senator LEVIN. Also do you know whether or not you have decided to train additional personnel to maintain that system manually, the system which should have been monitored by the built-in test equipment?

Have you had the trained personnel to manually carry out that function?

General MERRYMAN. I am pretty sure that we have had to increase the number of maintenance personnel in Europe over that which we thought we would need, Senator Levin, when we went forward with the system. We have determined, if you recall, one of the other things we were looking at was the number of people you save by fielding this, and there will still be savings.

Senator LEVIN. Less savings than anticipated?

General MERRYMAN. Right.

Senator LEVIN. Would you give us the cost of the additional personnel which you require to maintain that system?

General MERRYMAN. Yes.

Senator LEVIN. Will you also tell us the cost of any other test equipment that is going to be necessary as a result of the ability in test equipment not doing the job as required?

General MERRYMAN. Yes.

Senator LEVIN. And to add to your burdens, any other costs which result from the failure of that system to meet that particular specification. That is production, is it not?

[The information follows:]

PATRIOT

General MERRYMAN. A maximum of 115 additional maintenance personnel may be added to the Patriot support system world wide to rectify those faulty components that cannot yet be identified by built-in test equipment. Intensive corrective actions are in process to improve Patriot diagnostic capabilities. The number of support personnel actually required may decrease as the built-in test capability ultimately attained becomes known with field experience. The cost of personnel would be the cost of military pay for up to 115 Patriot peculiar personnel. The spaces to fill these slots in the force structure were available from Nike Hercules and IHAWK maintenance support personnel.

Maintainability data obtained during developmental and confirmation testing indicates a shortfall in the ability of computerized diagnostics programs to accurately localize system faults. Additionally, the results of logistics support analyses, which were approved by the Army in August 1981, indicated several changes were necessary in the Patriot maintenance concept. The revisions address three general areas:

(1) Missile surveillance and recertification at Government facilities in Europe and Conus vice contractor facilities in Conus only;

(2) Repair of battery replaceable units (BRUs); i.e., lowest level of common interchangeable module, at existing Government depots vice contractor facilities whenever it is cost effective; and

(3) Addition of a level of maintenance between depot and battalion (intermediate maintenance). Cost increases associated with these changes which include an intermediate level of maintenance are associated with purchase of tools and test equipment, documentation revision and publication, data collection/analysis, and logistics support are estimated at $406.4 million.

General **Merryman**. Yes, we are in the fifth year, the fiscal year 1984 dollars will be for the fifth year of production.

Senator **Levin**. Will you for the record give us that subcontractor background. I understand it is a cost-plus contract. I would be interested particularly in the number of subcontractors and how many of those were competitive contractors.

Dr. **Sculley**. We will be happy to provide that.

[The information follows:]

PATRIOT

Dr. **Sculley**. The Raytheon Company is the Patriot prime contractor. Martin Marietta and Thiokol are major subcontractors. There are several hundred other subcontractors and vendors that provide piece parts and materials to Raytheon for Patriot production. Of the direct vendors that supply materials to Raytheon, 15 percent of the contracts were competitive in fiscal year 1981, 33 percent in fiscal year 1982, and 43 percent in fiscal year 1983. 40 percent of the direct vendors with Martin Marietta were competitive in both fiscal year 1981 and fiscal year 1982. 27.3 percent of the contracts for Government furnished hardware were competitive in fiscal year 1981, 31.2 percent in fiscal year 1982, and 49.8 percent in fiscal year 1983. The prime contract with Raytheon in fiscal year 1983 is fixed-price incentive, and a firm fixed-price contract is planned for fiscal year 1984.

M1 TANK

Senator **Levin**. What would you indicate as your top priority of all the priorities that you have and I have to share your concern about many of your needs, by the way. I think the Army has been shorted in a lot of areas. I don't necessarily agree with every one, but looking at the broad overview we have short-changed the Army more than the other services.

What is your No. 1 priority?

General **Merryman**. The M1.

Senator **Levin**. Relative to that tank, that I gather would give us, we think, a leap ahead of the Soviets, tank-wise, quality-wise?

General **Merryman**. That is correct.

Senator **Levin**. On the question of the M1 there has been a suggestion that we consolidate the production lines. I am wondering whether or not you have done a cost-benefit analysis on the question of consolidating your M1 tank production?

General **Merryman**. We have, sir.

Senator **Levin**. What does that show?

General **Merryman**. It shows that it would cost additional money to consolidate. It shows that it is not feasible to consolidate since the two plants are not independent plants. Both plants produce something the other one uses.

In addition to that, there is a plant in Scranton that produces parts that both of them use. When I was out at Lima, as a matter of fact, I was surprised to find that over 60 percent of the floor space is used for fabrication of parts, where in Detroit most of it is used for just putting the tank together.

The project manager ran a study on that and it was that it would cost quite a few dollars to develop a totally independent plant.

Senator **Levin**. I have a number of other questions for the record in that regard and in other areas, too, Mr. Chairman.

Just a couple more questions, if I could, on some other areas.

The budget document of the Army identifies some categories of cost savings in the 1984 budget. What you call elimination of marginal acquisition programs, $204 million savings.

Can you give us a breakdown for the record of those programs?

General Merryman. Yes, we can.

[The information follows:]

Marginal Acquisition Program

General Merryman. I believe the document to which you refer is one known informally as "The Army Green Book"; its more official title is "The Army Budget—Fiscal Year 1984". This booklet is intended to serve as a handy reference to the Army's fiscal year 1984 budget as it was submitted to Congress on 31 January 1983. Page 85 of that document shows various savings and cost avoidances projected to be realized in fiscal year 1984 and the Army's Economies, Efficiencies and Management Improvements (EEMI) Program. One of the initiatives shown under the broad category of "Acquisition" is "Elimination/Reduction of Marginal Programs/Systems" with a projected savings and cost avoidance of $204.7 million for fiscal year 1984. This means simply that if it were not for these initiatives the Army's budget request would have either been that much higher (assuming everything now in the budget remained) or the composition of the budget would be different than it is.

The individual programs/systems included as a savings/cost avoidance to be realized in association with the fiscal year 1984 budget are as follows. These programs/systems are all in the broad acquisition area and the funds are either RDTE, procurement, or a combination of these appropriations.

Fiscal year 1984 savings

Program:	*Millions*
Terminal guidance system	$16.6
Smart munitions	4.0
Field Army survey	.7
Fire and forget Hellfire	78.9
Explosive demolition	2.7
Roland	8.8
Sotas	−[1] 21.7
ADP support equipment	−[1] 1.2
2.75" rockets	40.6
Atomic demolition munitions fire control	2.0
Command control systems	3.3
Armored forward area REARM vehicle	6.3
Improved message facility	9.4
Tritac MSE	2.0
Tritac MRTT	22.3
Elimination of winched vehicles	18.7
Terminal guidance projectile	6.2
Indirect fire training munitions	2.3
25-mm ammo PIPS	2.8
Total	204.7

[1] Negative figures represent investment cost that must be made in a given year in order to achieve savings in future years.

Senator Levin. Also you have taken credit for a $70 million savings by elimination of marginal programs in operations and $45 million for other acquisition improvements, $58 million reduced administrative overhead.

Would y~~ou give~~ us more detail on that for the record so that we can see how you reached those totals?

General Merryman. Yes, sir.

[The information follows:]

MARGINAL ACQUISITION PROGRAM

General **MERRYMAN**. Those savings are also shown on page 85 of "The Army Budget—Fiscal Year 1984" as savings or cost avoidances projected to be realized in the fiscal year 1984 budget under the Army's Economies, Efficiencies and Management Improvements (EEMI) Program.

Savings and cost avoidance of $45.2 million are projected for fiscal year 1984 under "Other Acquisition Improvements". Details pertaining to these savings follow:

Other acquisition improvements

Program:	Millions
Nuclear projectiles advanced development	$11.3
Ammunition requirements review	28.0
Ammunition acquisition efficiencies	5.9
Total	45.2

The other two initiatives mentioned are under the broad category of "Operations" and pertain to savings or cost avoidances within appropriations other than RDTE or procurement accounts. The following are the detailed items that constitute the projected savings and cost avoidances:

Elimination/reduction of marginal programs/systems (operations)

Item:	Millions
National Guard operating support	$1.6
Marginal program reductions	57.5
National Guard participation in RC infantry training	.2
Audiovisual activities	11.0
Total	70.3

Initiative: Administrative overhead (operations)

Item:	Millions
Consulting services	$29.0
Travel reductions	10.2
Elimination of price adjustment inventories	.5
Army clothing sales store	2.7
Manpower management program	1.0
Automated voucher examination system/other commissary initiatives	1.5
Controlled shredout program	4.7
Consolidated returned items stop payment system	3.1
Consolidation of:	
DAMO-C4 (resources)	
DAMO-C4 (plans)	.2
Reorganization of Reserve components management structure	5.7
Debt collection by mailgram	.2
Total	58.8

Senator **LEVIN**. Thank you very much.

Senator **GOLDWATER**. Thank you.

Does the staff have any questions?

JOINT STARS

Mr. **CARL SMITH**. General Merryman, on the subject of the Joint STARS program, is it absolutely essential that the Army have its own platform for that radar?

General **MERRYMAN**. Yes, I think so. You are talking about the only system we will have that is capable of finding what is happening right in front of our lines. I think that the corps commander or division commander, in order to have timely information, needs to have the system under his control.

We have looked at that several times because it would be great if we could turn it over to somebody else, but we are nearly as blind now as we were at the end of World War II as far as the capability of the corps commander or division commander knowing what the other guy is doing.

We need it in a timely manner from somebody to respond to his needs.

Senator GOLDWATER. Gentlemen, I am going to have to leave, but the staff will continue the questioning.

I want to thank all of you for your fine testimony. We will do our best for you. Thank you very much.

General WAGNER. I am the functional manager for tactical intelligence and related activities because of my job in DCSOPS. We just ran an excellent review of that JSTARS program.

We have very firm requirements on what we need. We need that moving target indicator, MTI, capability today. The only way we can get it within the next 3 to 4 years is to put it on one of our aircraft.

The radar, as you know, that we are going to develop will initially have MTI capability. Then the Air Force hopes to expand that to fixed target indicator, [FTI] capability and also give them weapon guidance.

Mr. CARL SMITH. The radar under development is what used to be called the Pave Mover?

General WAGNER. It probably will not at this time.

Mr. CARL SMITH. Which radar?

General WAGNER. I can't tell you. We have to get something to fit on the OV-1D aircraft that will give us needed capability. The technology has a lot to offer.

General MASON. We know that there are several radars from various companies out there today that will fit on an OV-1D and similar platform size from the Air Force. We know GE has the radar that will do it and Westinghouse does. We know the radar sitting on the F-15 will also fit. There may be others. So we know there are radars out there.

We must get that weight down to about 1,400 pounds. When we are talking about that one of the Pave Mover radars today is far too heavy.

Mr. DOTSON. As I understand the Air Force is still in the process of decision on what platform they are going to use for their radar. They first talked about Boeing 707 aircraft, Pave Mover, then went to a TR-1 platform. They are now thinking about going back to 707.

Does this indicate a lack of firm hardware configuration decision by the Air Force at this point?

General MASON. The Air Force is trying to make a decision today: in fact, they are meeting with Dr. Wade of OSD today to make that decision. If that airplane is the C-18 for the survivability reason, it will have to stand off far behind the FLOT, our estimate was about a [deleted] kilometers.

We doubt seriously if they could collect the data and pass it to us in the forward area.

Mr. DOTSON. The Air Force and Army are attempting to get the same radar?

General **Mason**. And use the same identical ground station and identical data link.

Mr. **Dotson**. The Air Force does not know yet which platform they will attempt to put the radar on?

General **Mason**. To the best of my knowledge, that is true.

Mr. **Dotson**. Is there also some uncertainty as to the amount of onboard data processing that the Air Force wants to do in its platform as far as the transmission of data to ground station?

General **Wagner**. Yes. Their requirement, as you know, is not as firm as ours is right now. They believe that they can take a growth radar and get additional capability in FTI and weapons guidance, but it will be a couple years after we field our MTI radar.

Mr. **Dotson**. Neither Service has as yet the total program cost for pieces of this JSTARS program: is that correct?

General **Merryman**. You can't do it since you don't know what the total program is. We could give you a number if it were all ours and just for ourselves. Until we get an OSD decision on what the total program is, we can't do that.

Mr. **Dotson**. But the answer is that there is not as yet, either Service, an estimate?

General **Merryman**. That is correct. Let me comment on one thing that you need to know.

Even though the Air Force may not know precisely what they want to do, you have to remember that everybody is in agreement that the first priority is the Army requirement.

In other words, the work that will be done initially is to get that Army capability in the field with an IOC of [deleted]. It is not as serious as it may sound that the Air Force may not quite know.

Mr. **Carl Smith**. Is [deleted] reasonable or is it overly optimistic?

Dr. **Sculley**. It is reasonable. We intend to meet it.

Mr. **Carl Smith**. Switching briefly to the weapon that will be employed with the JSTARS, JTACMS, Senator Goldwater asked earlier if it was practical that both services develop the same weapon.

The answer was, it seemed to me, that there could be some components which would be common, but you did not think it would be practical for both services to develop and employ an identical weapon.

General **Merryman**. That is correct

Mr. **Carl Smith**. Would you elaborate on that? What are the disagreements between the two services regarding the development of the single weapon?

General **Merryman**. I don't think it is so much a disagreement as a situation there, for example, you would need a bigger booster, say, to get a missile off the ground to go the same distance as one fired from an aircraft.

You would want to try to keep the booster as small as possible for an aircraft. As a matter of fact, depending on what aircraft it is, you would have to develop something or use a booster that fell within the parameters of what a given aircraft can handle, so many feet, so much weight, that sort of thing.

There was some indication that people were hoping we would be able to use totally the same missile. While that is a worthwhile objective, I don't think anybody currently believes that is possible. I think everybody pretty well accepts that.

The objective is to get a missile that is common to the extent that it is possible.

Mr. CARL SMITH. The net effect is that the Tactical Air Forces had virtually rejected the conventional stand-off weapon, the Air Force variant, and that the common missile from the Air Force point of view would really be employed on strategic bomber type units, is that correct?

General MERRYMAN. I have heard that, and I will ask Don to add to this, but at the last meeting I attended with the Air Force there I don't think they were talking about big bombers.

General PIHL. There were two Air Force statements of need, one for tactical forces and one for strategic.

Then there is also the ability to take the three types of weapon systems, T-16, Patriot variant, T-22 Lance variant, or generic weapon, T-19, and load that onto the bottom of a tactical fighter airplane, perhaps, if you have a smaller shaved-down missile that uses the essential components of the larger program.

It's that difference between the Air Force's tactical air statement of need and Strategic Air Command statement of need that is being worked on to see what degree of commonality we come up with as we approach the phase we are in right now, which is working down to a joint services operational requirement.

Mr. CARL SMITH. The tactical Air Force preference is for a weapon called the short-range attack weapon to the extent that the common JTACMS is really from the Air Force point of view moving toward carriage on B-52 type aircraft?

General PIHL. The thrust right now in terms of our joint negotiation is toward the B-52 type of launch.

Mr. JAMES SMITH. Let us talk for a minute about production rate on the M-1 and Bradley.

M1 BRADLEY PRODUCTION RATES

In your budget for fiscal 1984 you have 720 M1's for the year which is a drastic reduction from your plans last year. I understand that this is an affordability question. But is there a rate of M1 production that makes sense for stabilized production through the 5-year period?

General PIHL. I have talked to the PM about all of the rates. He assures me that there is no problem in executing the current program, which is to drop back to the 720 from the 855 or, as far as that is concerned, to go with the 840, which was the old proposed program, or to even increase production.

The bottom line is that he has no problem with what is currently proposed.

Mr. JAMES SMITH. Have you done the costing to show you what penalty you are paying for building at the rate of 720 a year versus the rate that you are facilitated to produce?

General PIHL. Yes, we estimate over the life of the program it will cost about $800 million additional.

Mr. JAMES SMITH. That is the full 7,000 buy?

General PIHL. Yes.

Mr. **James Smith**. You are still planning to ramp the Bradley to 90 a month?

General **Pihl**. Yes.

Mr. **James Smith**. Will this require you to do additional facilitization?

General **Pihl**. Yes, but I think all the money for that is already in the program.

Mr. **James Smith**. The facilitization money is in the program?

General **Pihl**. Yes, and is being spent now.

Mr. **James Smith**. At the one location FMC?

General **Pihl**. Yes. I don't know whether some of it goes to the subcontractors or not or whether it is pure FMC, but I do know they have what they need to facilitize.

Mr. **James Smith**. Why are you going to 90 a month on the Bradley versus 60 a month on the M1?

General Merryman. The Bradley started later than the M1. They were 18 months behind. Even by going to 90 a month you don't achieve the number of Bradleys you need out in the field. So you can't organize your units with the right number of M1's and Bradleys until around 1990, as I recall.

The third reason, of course, is that you save a lot of money.

Mr. **James Smith**. Are they comparable numbers of the M1 in terms of savings?

General Merryman. I don't think I have that.

General **Pihl**. We have not calculated that as compared to the M1 specifically.

Mr. **James Smith**. I think those would be of interest to the committee if you could do for us the calculations as to what the cost impact of not ramping up the Bradely production.

Cost Impact of Not Ramping

The additional cost of not ramping from 50 per month to 90 per month is approximately $1.2 billion. This increase is based on program stretch-out and a less favorable economic production rate.

AIR DEFENSE

Let me ask a question on the DIVAD gun. The Marine Corps is making do with Stinger and Hawk. The Army is talking about a broad range of air defense weapons.

Can you discuss the difference between your philosophy of air defense and Marine Corps philosophy of air defense? Why do you need the spectrum of air defense weapons when they are going to make do with Stinger and Hawk?

General Merryman. I see the Marine Corps planning to go ashore or be sent somewhere and make a beachhead, whether it is by land or by sea, and to be in a more stable configuration than what I see for the Army. I see the Army as a force that not only has to do what I just said the Marines are going to do, but have a force that will have to go back and forth over a very mobile battlefield, long ranges and short ranges, and therefore my answer is that we need a gun that can live with our other armored forces and also be sufficiently mobile to stay with them.

I don't think the Marines have that same problem to the extent that we do. That would be my answer.

General **Wagner**. The threat in most of their contingency areas is different than what we would have in central Europe.

Also, on some of their contingency missions where they would come on the European Continent they would be provided an umbrella by our Patriot and Hawk missiles.

Mr. **James Smith**. Let me ask a comparable question on the Viper situation.

VIPER/SMAW

The Marines have something that they call the small antitank weapon.

Are you looking at that as a Viper option?

General **Merryman**. This is a joint test for us both. Do we have something on the SMAW.

General **Mason**. We are looking at it. I believe the Chief of Staff testified to that effect a few weeks ago. We don't consider the SMAW in the same category which we do the LAW.

Mr. **James Smith**. If you could compare its capability for the record. The SMAW is not a throw-away weapon and the Marines are buying it in quantity.

General **Merryman**. It is not one of the candidates. We don't want to be misleading you. We are looking at it like we are looking at the UMAW, but it is not a test candidate.

Mr. **Carl Smith**. Late last year the Army relinquished the management of the JVX program for the Navy.

Does the Army still support development of JVX and does the Army have a requirement for a JVX type vehicle?

JVX AIRCRAFT

Dr. **Sculley**. We have a requirement and we support the program. We are disappointed at this point that there was but one offer for the engineering development phase. We had hoped to have competition during this phase. The lack of competition and associated potential costs with it, I think, will cause the Army to review its situation, but the direct answer to your question is that we have a requirement for the JVX platform and we support the program.

Mr. **Carl Smith**. What number of aircraft do you anticipate the Army will procure if the aircraft is developed as projected now?

General **Merryman**. 284 is our current projection.

Mr. **Dotson**. Let me ask one more question pertaining to the M1.

SECOND SOURCING OF TURBINE ENGINES

The Army is requesting funds for second source production of turbine engines. Can you tell me what the cost is to set up a second source and what benefits you see in terms of cost schedule performance and mobilization base?

Dr. **Sculley**. Before General Pihl provides some of the details, I would like to state for the record that it concerns me a great deal to have our entire main battle tank engine production as well as all our rotary wing aircraft engine production, with the exception of the T-700 and T-701 engine, under one roof.

This, as much as any other one factor, concerns me a great deal. I don't even like to think about the impact of a peacetime accident in this situation. This has been at least a primary concern to me.

I think the preliminary look at competition has had positive effect in moving AVCO toward solving some of the quality problems that they have encountered. That is not the primary purpose of looking at the second source, but again I think these are two important considerations in the second source decision.

General PIHL. It is estimated that the engine second source will add about $110 million to the program. It spreads out as compared to a single year buy from AVCO, starting over that period of time that we would cut it in and wind up with some savings in the out years.

I will be happy to show you figures for the record.

[The information follows:]

M1 TANK PROGRAM

The projected delta cost for a second source engine program versus the sole source program is:

Fiscal year:	*Millions*
1983	+$24.9
1984	+20.0
1985	+109.0
1986	+68.4
1987	−50.2
1988	−64.5
Total	+107.6

This program includes start-up requirements (EOQ) for multiyear contracts at both the current producer and the second source. Further savings could be expected in the future for spares and repair parts to sustain the tank fleet in service if two sources were maintained.

Mr. DOTSON. You do expect savings from the second source compared to a single source operation?

General PIHL. Over time.

Mr. DOTSON. Do you have any indication of the return on investment that such savings will be relative to the cost?

General PIHL. Given the estimates holding true, about $50 million in 1987 and $65 million in 1988.

Dr. SCULLEY. I think it also would be helpful to add that these savings are projected against a current M1 and M1–E1 program.

I don't have a crystal ball, but I can't help but think that the tank production in some form beyond that that would take advantage of this engine.

Mr. DOTSON. Are there other benefits to be derived from the second source as far as schedule performance in addition to the cost savings and mobilization base expansion?

General MERRYMAN. Competition. In other words, the fact that whoever the second source is will be putting the heat on the first and only source.

Mr. DOTSON. The benefits of that to your expectations would be that delivery engine would have fewer rejections, the rejection rate would be down, the manufacturing would be improved as a result?

General MERRYMAN. Yes. It works both ways. What you say would be equally applicable to the second source.

Mr. **Dotson**. Thank you.

Mr. **Carl Smith**. The record will remain open until 5 p.m. for questions for the record.

[Questions with answers supplied follow:]

Questions Submitted by Senator Barry Goldwater, Answers Supplied by Dr. J. R. Sculley, Assistant Secretary of the Army (RD&A); and Lt. Gen. J. H. Merryman, U.S. Army, Deputy Chief of Staff for Research, Development, and Acquisition

BRADLEY FIGHTING VEHICLE

Senator **Goldwater**. Briefly review the Bradley Fighting Vehicle, what are its capabilities, why do we need it, where does it stand in the procurement cycle, how much does it cost?

Answer. The Bradley is a lightly armored fighting vehicle with exceptional firepower and mobility to support both mounted and dismounted operations. It has a stabilized turret which allows accurate 25 millimeter gun and 7.62 millimeter machinegun fire while on the move. The Bradley also fires the Tow antitank guided missile for long range tank-killing capability. All turret mounted weapons can be fired day or night in all weather by virtue of a thermal imaging sighting system. The Bradley's mobility is compatible with the M1 tank. It also swims and can be air transported in the C141 and C5A aircraft. Protection is provided by composite steel and aluminum spaced laminate armor that protects against 90 percent of the anticipated Warsaw Pact ground weapons.

The Army needs the Bradley to provide the necessary offensive and defensive capabilities, which when combined with the M1 Tank on the battlefield, will give us the ability to fight and win against a numerically superior aggressor. By virtue of its exceptional firepower, mobility and protection, the Bradley provides our infantry and cavalry with the option of fighting mounted or dismounted.

With the fiscal year 1983 procurement, 1700 Bradleys are under production contract. As of 28 February 1983, the Government had accepted delivery of 346 vehicles.

The Bradley's rollaway cost in fiscal year 1984 constant dollars is $1.13 million.

Senator **Goldwater**. What is your procuremen strategy for the Bradley? Are you considering a second source for the Bradley to get some price competition? Why can't you get FMC to negotiate a fixed price contract for the Bradley?

Answer. The Army's procurement strategy for the Bradley is based on sole source vehicle assembly with breakout, second sourcing, competition and multiyear procurement of subsystems, components and vendor supplied parts/materials. In October 1981, the Army decided against establishing a second source for vehicle assembly and procuction which represents approximately 40 percent of the hardware and unit cost. This decision was based on cost effectiveness, i.e., to establish a second source would require and additional $780–900 million. The fiscal year 1980, fiscal year 1981 and fiscal year 1982 Bradley production contracts are Fixed-Price-Incentive type contracts. The fiscal year 1983 vehicle production contract, which is to be definitized within the next 30 days, will either be Firm-Fixed-Price or Fixed-Price-Incentive.

Senator **Goldwater**. A few weeks ago you advised the committee that you would not put the TOW 2 right on the Bradley. Please insert a copy of your letter of notification in the record at this pont and explain that decision.

Answer. The Bradley TOW 2 program was more than an improved sight. It consisted of the addition of a thermal tracking capability for the Bradley TOW guidance system. Although the current Bradley TOW system will fire and accurately guide any of the three types of TOW missile, the thermal tracking capability would allow accurate guidance of the TOW 2 missile through obscurants and electro-optical countermeasures. To achieve this capability requires the replacement of the integrated sight unit and the command guidance electronics, a minor modification to the TOW missile launcher, and associated changes in wiring, cabling, and turret distribution box controls. These hardware changes generate changes in vehicle integration, training materiels, maintenance procedures, test equipment, and manuals. The original cost of this program approached one billion dollars. Even with reduced scope options, the cost of this improved guidance for the Bradley was unaffordable considered in the context of all Army requirements and programs. The program is being reviewed to determine if further program scope reductions (such as elimination of retrofit provisions) would reduce costs to an affordable level. If so, then the Army will reconsider its decision not to put TOW 2 capability on the Bradley.

Senator **Goldwater**. I have heard some grumbling from field commanders that they don't like the decision to cancel the TOW 2 sight. What battlefield capabilities do you give up?

Answer. The TOW 2 system would be designed to permit accurate antitank fire through obscurants and electro-optical countermeasures. As an effect of changing to a digital guidance configuration, the TOW 2 system would also increase the accuracy of each missile. Both the basic TOW system now on the Bradley and the TOW 2 system are capable of firing any of the three types of Tow missile.

Senator **Goldwater**. If you are not going to go with the full TOW 2 capability, why not take the TOW off the Bradley completely? How much money would you save?

Answer. The TOW system has proven to be an extremely accurate and deadly long range antitank guided missile system. Its use by Israeli forces in recent conflicts has confirmed its effectiveness against Soviet equipment. The TOW system on Bradley provides the same effectiveness. It provides mechanized infantry and cavalry forces with the ability to assist in the antiarmor battle, which is a necessity if our ground forces are to fight and win. There would be very little money saved by removing the TOW system from the Bradley. The integrated sight unit is the highest cost component of the TOW system, but is also the fire control for the 25 millimeter cannon and coaxial machinegun. Removing the integrated sight unit would require a new development program for a fire control for the 25 millimeter cannon with attendant logistical changes.

Senator **Goldwater**. The California magazine recently carried an article which was quite critical of the Bradley. Would you provide for the record an analysis of, as a rebuttal to, the California article? The most damaging allegation in the California article is that the aluminum armor on the Bradley actually contributes to casualties when it is struck by an enemy round. What is your response to this allegation?

Answer. The following paper on the California article will address in detail your two questions.

California Magazine Excerpts

Claim.—The Army expects to spend $13.4 billion over the next several years to acquire 6,882 of these machines. p. 62.

Facts.—The Army's total acquisition program costs for the Bradley amounts to $11.8 billion for 6,882 vehicles procured from fiscal year 1980 through fiscal year 1989. The $13.4 billion cited in this article was the Bradleys' total program costs stated last year in the Selected Acquisition Report (SAR). This figure includes costs for system procurement, research and development, military construction, 25mm ammunition procurement, and anticipated (but unfunded) future product improvements. the Bradley's total program costs today for these same cost elements are $11.8 billion.

Claim.—According to one munitions expert, each one could be knocked out with an M42 grenade—price $2. p. 62.

Facts.—The M42, capable of penetrating 4 inches of RHA, is a shaped charge bomblet, not a hand grenade. It is delivered in a cluster from artillery or aircraft. An artillery projectile (155 Improved Conventional Munition) contains 88 grenades and costs about $493.

Claim.—By 1982 the actual program cost per vehicle had turned out somewhat higher—$1.94 million a copy. p. 63.

Facts.—The average program cost per Bradley is $1.71 million in escalated dollars for 6,903 vehicles (21 prototypes, 6,882 production vehicles) bought between fiscal year 1980–89. Program unit cost contains manufacturing costs, GFE, production management, tooling, project management, test and evaluation, tools and test equipment, training equipment, initial spares, PIPs, RDTE, and ammunition. The rollaway cost for the Bradley is $1.13 million. This cost includes hardware, contractor production management, Government support, and engineering support to production.

Claim.—There is the "too tall" problem. p. 65.

Facts.—The height of the IFV/CFV has been critically reviewed numerous times, and in each case the design has been supported. The vehicle height is the result of wheel travel required for high-speed, cross-country operation, human factors for the 95th-percentile man, required gun depression, and the IFV mission profiled, requirements. Unlike the tank, which is designed to sustain attack by large-caliber weapons and will, therefore, expose itself intentionally when required, the Bradley is designed to fight from defilade. The elevated position of the weapon station aids this aspect. If forced to move in an area without cover, the Bradley can provide its own smoke by using its grenade launchers or smoke generator.

Claim.—There is the "too fat" problem. p. 65.

Facts.—The Army decision on vehicle width was deliberate. Increased crew protection and better tactical mobility outweighed the need to take off side armor for C-141 transport. The armor was designed to be removable to permit the use of C-141 aircraft to provide strategic mobility. After the suspension has been "snubbed" to reduce vehicle height for loading, the Bradley can still be driven under its own power. It is winched aboard; winching is standard procedure for loading heavy cargo aboard the C-141 to prevent damage to the aircraft. It takes only about one hour to prepare the vehicle for loading. The Bradley has been successfully loaded and unloaded from the C-141. It is fully transportable by this aircraft.

Claim.—There is even a "too small" problem. . . . there is only enough room for six soldiers—half a squad. p. 65.

Facts.—The present squad mounted in the M113 includes 11 soldiers. The 10-man squad, as a part of the Division 86 organization, was determined to be optimum. The Bradley carries a 10-man squad. During Operational Test II, the Bradley was successfully tested with 10- and 11-man seating configruations. Though the 11-man squad is not optimum, it has been demonstrated as feasible, if required.

Claim.—Apparently, the Bradley is putting in all those miles with its chain gun locked up in storage. p. 66.

Facts.—The 25mm gun is always installed in the vehicle during Initial Production Testing (IPT) at Aberdeen Proving Ground. The Army requires that a Key operating component on the gun be removed from the weapon when it is outside a secure storage area. The bolt and track assembly, therefore, is removed from the weapon except during live-fire exercises. Even though the bolt and track assembly is removed for a portion of the test, the validity of the test is not affected.

Claim.—The Bradley can deliver on most of its promises only part of the time. p. 66

Facts.—During the ongoing IPT at Aberdeen, the Bradley is exceeding its reliability requirements by more than 50 percent. While performance tests are not yet complete, the Bradley is expected to meet or exceed all requirements.

Claim.—The armor provides protection at the expense of your field of view. p. 67.

Facts.—Although the driver cannot see to his right with his hatch closed, the vehicle commander (buttoned up) has full 360° vision of the battle field. It is Army practice for the commander to control the vehicle whenever it turns or backs up.

Claim.-Army spokesmen admit that the rifle-firing ports in back have more psychological than combat value. p. 67.

Facts.—The firing port weapons are intended for area suppression. Firing of full tracer ammunition assists in achieving this capability. The vision blocks allow the mechanized infantryman to maintain his terrain orientation, and to be aware of the nature of the battle prior to dismounting. Tests (Operational Test II) have shown that trained crews can employ the weapons effectively. While mounted, their high volume of fire is particularly useful in suppressing close-range threat weapons.

Claim.—Among the troop carriers of the world, ours are virtually the only ones made out of aluminum. p. 127.

Facts.—Other countries that have chosen aluminum for their infantry vehicles include Great Britain (MCV-80), Belgium and the Netherlands (AIFV), and France (AMX).

Claim.—In Vietman, the Yom Kippur War, and Lebanon, commanders have been absolutely unable to make their troops ride inside M113s. p. 127.

Facts.—During normal operations, when not under fire, it is more comfortable to ride on top of an M113 in a hot climate. During intensive combat, many crews in Vietman reacted by getting inside the M113s. If one wants to fire a weapon to the rear or flanks of an M113, then he must get above the deck, which is unlike that needed for the Bradley's Firing Port Weapons. During artillery mortar and rocket attacks in Vietman, crews got inside the M113 and closed the hatches.

Claim.—In Vietman, the M113 proved so vulnerable to homemade land mines that drivers resorted to lying on top of the roof and manipulating the controls with sticks. p. 128.

Facts.—Initial deployment of M113s to Vietman did result in the type of actions described. As a result of the vulnerability to mines, drivers' compartments were sandbagged. This significantly reduced mine blast injury, and drivers no longer went to the extremes stated in the article. The lesson learned was carried back to TACOM, and a steel mine plate was fabricated and applied to M113s in Vietman. These plates successfully defeated all but the largest mines encountered, though they did not defeat RPGs used as mines. The IFV has an applique steel mine plate to defend against mines. The lesson learned in Vietman was not ignored.

Claim.—The RPG-7 is carried by every rifle squad in the Warsaw Pact armies, but the RPG-7 has been declared an "overmatch"; therefore, don't worry about the RPG-7. p. 128.

Facts.—The AT-7, replacement for the RPG-7, is effective against the armor of the IFV; however, it has a maximum range of 1,000m. The IFV can defeat targets with 25mm High Explosive Incendiary Tracer (HEIT) beyond that range, effectively suppressing RPG or AT-7 fire. RPG-7s employed against M113s in Vietnam did not result in catastrophic destruction or significant burning unless they ignited onboard fuel or ammunition.

Claim.—The Bradley has thicker armor than the M113, probably about twice as thick. p. 127. (See below for response to this and the next six claims.)

Claim.—Both FMC and the Army have conducted classified tests that show the murderous, explosion-amplifying effects of aluminum armor. p. 62.

Claim.—They've tested the Bradley armor against machine guns, mines, and artillery, but they will not fire a shaped charge into it. I think they've decided that's too fraught with danger to the whole program. p. 127.

Claim.—The main point remains—the Army has no data on how the Bradley armor will stand up against the weapon most likely to be used against it. ". . . the Army doesn't expect to encounter HEAT where it's going to use the vehicle." p. 128.

Claim.—The Army has not tested the Bradley armor against the HEAT round, nor does it have any immediate plans to do so. p. 127.

Claim.—The vehicle's armor is made of aluminum, a metal whose chemical energy when oxidized is ten times greater than that of TNT. p. 62.

Claim.—With aluminum, the displaced metal forms spall at the edges but vaporized in the center. This vapor literally becomes fuel for the explosion, intensifying the deadly effects of the blast. p. 127.

Facts.—The group of statements (above) in their aggregate constitutes an attack on aluminum as a choice of armor for the Bradley Fighting Vehicle and a distorted picture of behind-the-armor effects of shaped charge penetration of armor. The Bradley aluminum armor is not thicker than the M113 armor. The Bradley side armor is 1.47 inches thick; the M113 side armor is 1.75 inches thick. Further, the Bradley armor is not all aluminum. It is composed of two layers of steel (total of .47 inches) and a single 1.0-inch aluminum wall. Each layer is separated by 1 to 3.5 inches of space. This "space-laminate" armor design is especially effective because the gaps reduce depth of penetration and each succeeding layer "catches" some of the spall (fragments of the armor), thus reducing the size of the "cone of destruction" actually penetrating the vehicle interior. The Bradley armor design specifications were based in part upon an analysis of threat weaponry, their density on the battlefield, and their effectiveness. The Bradley has been tested against each design specification. Shaped charges have been tested on both the M113 and the Bradley. Although an RPG-7-sized shaped charge warhead will penetrate both vehicles, tests (Development Test II) have shown that the additional casualty-producing effect of aluminum to be virtually nonexistent. A simple comparison of the oxidation rates of aluminum and TNT is distorted since once initiated, TNT oxidizes completely, but only aluminum surfaces oxidize due to formation of inhibiting aluminum oxides. The rate of aluminum oxidation is more than 13 times (not 10 times) that of TNT, but complete oxidation will only occur when aluminum is in a fine-powdered or vaporized state. To create substantial aluminum in this state requires a very large warhead. The oxidation of aluminum in this event is of secondary importance to other effects of the warhead. Vaporific effects can be created with steel armor also. Aluminum armor has been proven to be better than steel armor on a weight basis for protection against fragmentation-type landmines and artillery bursts. Against shaped charges, some increases in pressure and temperature due to the aluminum material do occur, but these increases are negligible.

Claim.—Aluminum armor helps kill soldiers three ways. First blast overpressure from an anti-tank-size round is twice as high behind aluminum as it is behind steel, reaching levels that would be expected to kill a man by rupturing his lungs. Second, a fireball develops with an associated blinding flux of light (the equivalent of several hundred flashbulbs), causing localized third-degree burns. Third, the extreme temperatures and pressures inside the chamber produce concentrations of oxides of nitrogen thousands of times higher than those encountered during the Los Angeles smog alert. p. 127.

Facts.—The vaporific effects cited are possible to achieve, but only for very large shaped charge warheads. Not stated is the fact that the same effects will be observed regardless of the type of armor material used.

Senator GOLDWATER. What production rates do you now plan in your 5-year program?

ANSWER. We will produce Bradleys at 50 per month during the fiscal years 1983 and 1984 funded delivery period. We will ramp to about 70 per month for the fiscal year 1985 funded delivery period, and again, ramp to 90 per month beginning with the fiscal year 1986 funded delivery period.

Senator GOLDWATER. Can FMC ramp up production with its current facilities or will additional facilities be necessary?

ANSWER. Tooling at FMC, General Electric and Hughes Aricraft must be increased for production ramp, however, there is no need for additional "brick and mortar" facilities.

Senator GOLDWATER. Why ramp up Bradley production in the out years if you do not plan to increase M1 tank production beyond 60 per month.

ANSWER. As part of our force modernization/readiness upgrade efforts, the M1 and Bradley are being fielded as a combined arms team to the same divisions. The Bradley lags M1 production and fielding by approximately 18 months. Therefore, to close this fielding gap, Bradley production must surpass M1 production. Also, by ramping Bradley production from 50 per month to 90 per month total program costs will be reduced by 20.7 percent and buyout would occur in fiscal year 1989 instead of fiscal year 1992.

Senator GOLDWATER. How much money is in your fiscal year 1984 budget to ramp up the Bradley production in the out years?

ANSWER. There is $26.6 million for tooling increases at General Electric ($23.7 million) and Hughes Aircraft ($2.9 million).

Senator GOLDWATER. Has there been any interest by our allies in buying the Bradley?

ANSWER. The Saudi Arabian government has shown some interest in the Bradley. Saudi representatives from their army attended an M1/M2/M3 vehicle demonstration at Fort Hood, Texas last summer and a demonstration is planned in Saudi Arabia in July 1983. However, we do not have a formal request from the Saudis for the purchase of the Bradley.

M1 TANK PROGRAM

Senator GOLDWATER. How is the Abrams tank doing? We continue to hear old criticisms, but what has occurred in the past year?

ANSWER. Since congressional hearings last year, the Army completed developedment testing for the M1 and met all but two of the Reliability, Availability, Maintainability and Durability, (RAM-D) goals. These were track life and powertrain durability. Powertrain durability testing continued but was suspended in September after three premature engine power losses. These failures were ascribed to poor manufacturing quality. The Army and AVCO-Lycoming the engine manufacturer, immediately began an intensive audit of the manufacturing quality processes and many improvements have been made. The Army plans to restart the powertrain durability test this summer, when it is anticipated the production engine will meet the stringent durabilty requirement. The powertrain durability test should be completed before the start of the 1983 funded delivery period allowing the Army to ramp to more than sixty tanks per month and produce the 855 fiscal year 1983 tanks in the normal funded delivery period.

The shortfall in track durability is a function of our technological ability to manufacture a bonded, integral pad track that meets the high goal of a 2,000 mile life on a sixty-ton vehicle. The current track gives the performance needed, but longer track life will lower operation and support costs. The Army has funded track development programs dedicated for improving track for all combat vehicles and the M1 will ultimately benefit from this research.

The Army fielded three battalions of M1s in Europe by last fall and all participated in the Reforger Exercise with outstanding results. The M1 was fast, agile, fully supportable and demonstrated an operational ready rate of 97 percent during the exercise. This is an excellent rate, even for a mature system. There are four battalions fielded in Europe now, and two in the Continental United States (CONUS). By the end of fiscal year 1983 there will be eleven active M1 battalions and one North Carolina National Guard Battalion.

Three sigificant achievements were made in production during fiscal year 1982. The production contract was successfully transitioned from Chrysler Defense to General Dynamics. Despite a strike by the United Auto Workers Union in September, tank production has gone smoothly. The Detroit tank plant was brought on line and had ramped to a production rate of thirty tanks per month in less than a year. It should also be emphasized that a very positive trend in cost reduction has been established. Negotiations on the fiscal year 1981 contract saved about 18 percent in hardware costs. These and other prior year funds made available from program replanning and additional savings were transferred by the Congress to fiscal year 1983 to increase the fiscal year 1983 tank buy. A multiyear contract agreement was entered into for the major fire control components, again saving money. These savings are real but not readily noticed because the program stretch-out decision made last year for affordability reasons mask these cost reduction trends. Fiscal year 1983 will be a year of stability for the M1 and a year of testing and review for the M1E1.

Senator GOLDWATER. Would you put the summary of last summer's Reforger report on the M1 in the record at this point and discuss the key findings?

ANSWER. The following is a summary of M1 performance in Reforger 82. Attached is a memorandum from the Commander of the Third Infantry Division (Mechanized) to the Chief of Staff and Secretary of the Army which gives a more detailed report on how well the M1 performed. Speed and mobility were exploited by Third Infantry Division (Mechanized) using its three M1 battalions. Aggressive attacks by the opposing forces were effectively halted by the M1 tanks. Flanking efforts by the opposing forces could not overcome the superior speed and agility of M1. During daytime fog conditions, the M1 crews used their thermal sights to continue to maneuver, providing them additional advantage over opposing forces. The thermal sights also provide this capability at night and when the battlefield is obscured by smoke. The maintenance was done by forward maintenance units from division and corps at field maintenance sites.

Data based on 174 M1s (three battalions) during the eleven-day exercise showed that:

No M1 was nonoperational for more than a 24-hour period before it was returned to action.

Out of 174 M1s, there were eleven engines replaced, but nine were repaired in the field and returned to service leaving only two engines which had to be evacuated to depot level.

By comparison, 63 M60 tanks had seven engines which had to be evacuated for depot-level repair.

The number of M1s assessed as non-mission-capable (NMC) each day of the exercise was: Note that only three more were non-mission-capable at the end of the exercise.

Day:	*NMC*
1	1
2	2
3	1
4	7
5	6
6	2
7	1
8	3
9	1
10	2
11	3

Senator GOLDWATER. Where do you stand on the engine? I know you were having problems with the AVCO engine. Are you going to a second source?

ANSWER. As of the end of January, 1,082 turbine engines have been delivered versus contract requirements of 1,111. Quality has been improving due to intensive efforts by AVCO-Lycoming and the Army, but is still not meeting all requirements.

AVCO is improving its quality control program in its production facility at Stratford and has established a monthly audit program. Ten out of approximately sixty engines are torn down every month and scored by a group of engineers. The purpose of the scoring is to predict engine durability and to provide feedback to the quality audit program. Recent data are encouraging. The Army is confident that the turbine engine can meet requirements and is the right engine for the M1. Turbine engines are the power plants of choice for heavy combat vehicles of the future.

Despite the manufacturing quality problems, the engine has not caused the Army delays in tank production, though a number of management actions have been required to maintain production deliveries. Training and fielding of new battalions has gone as scheduled. The current durability performance is at a level that does not hamper operational effectiveness and the engine is fully supportable in the field. The Army will continue to pursue durability improvement, as attaining the desired goal will result in reduced operational and support costs.

The Army released a Request for Proposal for second sourcing the engine in response to the House Appropriations Committee report on the fiscal year 1983 Department of Defense Appropriations Bill, which stated that "the Army should proceed with determining the feasibility of second sourcing, on a competitive basis, the AGT-1500 gas turbine engine for the M1 tank using existing resources. The data obtained from these second source proposals should be submitted to the authorization and appropriations committees no later than May 1, 1983." No decision has been made at this time, and there is no intent to make any awards before notifying Congress.

In preparation for proposals that are due to the Army in May, a preproposal conference will be held in March with responding contractors. Upon receipt of the proposals, the Army will begin evaluation and formal Congressional notification. If a proposal is deemed advantagaeous, contract award is planned for August.

M1 TANK PROGRAM

Senator GOLDWATER. Last year you told us you were going to ramp production from 60 to 75 to 90 per month over your 5-year program. Now as I understand it, you plan to stay at 60 per month over the 5-year program. Why such a drastic change?

ANSWER. The stretch-out of the M1 program was an affordability decision taken so funding for a balanced Army program would be available. The program was not cut back because of producibility, quality problems, or anything else but affordability.

Senator GOLDWATER. Is there an optimum production rate for the M1?

ANSWER. Yes, the optimum production rate is 90 tanks per month. This is the optimum rate when considering production at both Lima, Ohio, and Warren, Michigan together. It should also be understood that two plants are interdependent and that optimum rates consider facilitization, tooling, and fielding rates.

Senator GOLDWATER. Is there any money in your budget to go beyond a production rate of 60 per month?

ANSWER. The fiscal year 1983 advance which supports the fiscal year 1984 buy is funded to produce 120 Long Lead Sets more than the 720 fiscal year 1984 tank buy.

Senator GOLDWATAER. You are now doing the majority of the M1 work at the Lima, Ohio plant. The Warren, Michigan tank plant does some M1 component work, but has primarily produced M60 tanks in the past. There are no more requirements for the M60 tank. Can't one of these plants be shut down if you are going to produce only 60 M1s per month?

ANSWER. Both plants are currently assembling about 30 tanks per month. The Detroit plant supports the Lima plant with component machining; Lima supports Detroit with hull and turret fabrication. Operations could be consolidated at one plant; however, the best quality work is on the day shift. Consolidation of machining and assembly at Lima would require an expansion of Lima, extensive plant rearrangement, and installation of machines and fixtures that would take 30–36 months. The ramp to a new rate at one facility would add at least 6–12 months to the above timespan. During this time the ability to produce tanks would be severly hampered and the cost would increase due to the last learning and work arounds required. The above timeframes are after start-up and congressional approval of funding which would take another 18–24 months. Therefore consolidation would be accomplished so that only the last 2 years of the 7058 program could be produced from a single plant.

Senator GOLDWATER. You prematurely canceled ongoing testing of the M1 at Aberdeen, Maryland, last year. Why did you do this and what are your plans to resume that testing?

ANSWER. The powertrain durability test was suspended in September 1982 because of quality control problems (cracked recuperator welds, and bad finish on a retaining nut at a bearing seal).

The Army and the contractor have an intensive quality control program ongoing that should correct these problems.

This problem has surfaced in only a handful of engines in the field and shows up as a degradation of power, not an engine failure.

The Army anticipates a restart of testing in August 1983.

Senator **Goldwater**. Compare the M1 with the T80. Which is the better tank? Which is further along in development?

Answer. The table below provides a comparison of tank characteristics:

SOVIET/UNITED STATES TANK FACTS

	Soviet tank facts, March 1982 estimate		U.S. tank facts Mar. 1, 1983 actual	
	T-72HH/T-72M	T80	M1	M1E1
Production quantity			916	0.
Rangefinder	[Deleted.]		Laser	Laser.
Night vision			Thermal	Thermal.
Computer			Solid state	Solid state.
			Digital	Digital.
Armor hull			Special	Special.
			do	Do.
Turret			105 mm	120 mm.
Gun			Rifled	Smooth.
Basic load			55	40.
Engine			1,500 hp	1,500 hp.
			Turbine	Turbine.
Speed (hwy)			45 mph	42 mph.

The T80 is lighter than the M1. However, we believe a compartimentalization, fire supression, and mobility of the M1 make the M1 a better tank.

Both tanks are through development and into production, but it is expected that Soviet production rates will increase rapidly as they have in the past. The T80 is evolutionary and its manufacturing processes may be considered more mature than the M1 with its more revolutionary developments.

Senator **Goldwater**. Where do you stand on converting from the 105mm gun to the 120 mm gun?

Answer. The M1E1 is an M1 with 120 mm gun system, nuclear, biological, and chemical hybrid collective protection system with crew cooling, armor modification and suspension, and final drive upgrade.

Training and Doctrine Command revalidated the need for the M1E1 with 120 mm gun and ammunition on 21 January 1983 and Development Testing II began January 1983 at Aberdeen. The program is on schedule for initial production delivery in the fourth quarter of fiscal year 1985. The initial delivery represents 140 tanks of the 720 requested for fiscal year 1984.

Senator **Goldwater**. Have the Marines indicated any desire to buy the M1?

Answer. The Marines are assessing all possible tanks for future operations. They have programed for a new tank in fiscal year 1987 which is often refered to as a M1 budget line; however, no decision has been made at this time.

Senator **Goldwater**. How much per tank would you charge the Marines if they wanted to buy the M1 this year?

Answer. The Marines would be charged the same amount of money that the Army pays. The exact amount would depend upon the year that they want the tanks, the configuration, the support requirements, and the final contract negotiations.

Senator **Goldwater**. How much would have to be added to your fiscal year 1984 budget to increase production from 720 to 840 tanks? to 900 tanks?

Answer. In order to procure 120 additional tanks in fiscal year 1984 the Army would require an additional $77.3 million for tanks and $25.0 million for spares to support those tanks. It is estimated that $105 million for tanks and $11 million for spares would be needed would to build 60 more tanks (total of 900). If the 840 tank per year rate is to be maintained, an additional $42.0 million would be required in fiscal year 1984 for advance procurement for fiscal year 1985.

VIPER/LAW

Senator **Goldwater**. Do you still need to replace the LAW?

Answer. Yes. The current M72 LAW is insufficient to meet our requirements. A replacement is required that will provide higher hit probability, greater lethality, and longer effective range.

Senator **Goldwater**. How much money have you spent on facilitization for the VIPER?

Answer. $58.2M

Senator **Goldwater**. Give me some details on your planned competition of antitank weapons. When will it begin, who will compete, and what will be your evaluation criteria?

Answer. Testing is scheduled to begin 1 Apr 83 and be completed by 31 Jul 83. Both the Army and the Marine Corps decided to develop and use a very orderly procurement process which would provide valid costs and schedule data in addition to technical data on which to base an evaluation and selection of a possible alternative to Viper. This formal procurement process will result in the information requested by Congress after completion of testing on approximately 31 Jul 83. A Joint Army/Marine Coordinated Test Program (CTP) has been developed and has been approved through the Department of Defense level. For test purposes, the performance parameters that were relaxed were weight to 20 lbs. or less; carry length to 40 inches or less; penetration to 14 inches or greater; precision accuracy to 2.0 mils or less; and time of flight to 250 meters of 1.25 seconds or less. The rationale used was to insure that the parameters would result in systems being available for testing and the absolute maximum exceptions that the Army and/or Marine Corps could allow for a weapon. Five competing systems that meet the RFP requirements are on contract. Contractors are scheduled to deliver systems for tests no later than 1 April 83. The five competing systems are LAW (United Kingdom), AT-4 (Sweden), Improved LAW-750 (Norway), ARMBRUST (Germany) and a variation of Viper (US). In addition, the basic M72A3 LAW and cost reduction Viper systems will also be tested in the program.

The Army will evaluate the systems in 8 major areas: Technical, cost, training supportability, portability, logistics supportability, producability, management and safety. The specific factors are: Technical—Penetration of armor, effective range, precision accuracy, weight, length, time of flight to 250 meters, impluse noise, reliability, system function and environment, and sight and round capable of 500 meters. Cost—Battlefield scenario cost performance effectiveness, unit flyaway cost, nonrecurring U.S. investment cost and total cost of options. Training Supportability—Training devices programs of instruction and field manuals/training manuals. Portability—Portability and ruggedness over mobility/portability course and operational compatibility with fighting load and vehicles. Logistics Supportability—Maintenance concept; storage; shipping and handline concept; and technical manuals. Producability—Production capability on site and in the United States, critical materials/components availability, and completeness/propriety limits of technical data. Management—Contractors experience and past performance, adequacy of contractor/subcontractor facilities for the program, adequacy of management capability and management plan. Safety—Go/no go. A system will not be considered for a follow-on contract award if a failure occurs that verified that there would be a safety hazard that would imperil the safety of a gunner. The actual weight assigned to each factor is procurement sensitive and cannot be furnished at this time. The factors listed above are in priority order of most important listed first.

The Marine Corps has slightly different criteria and will evaluate the systems tested in 4 major areas: Technical, cost, logistics supportability, and management. The specific factors are: Technical—System performance, operations and training, and producability. Cost—Battlefield scenario cost performance effectivness, unit flyaway cost, non-recurring U.S. investment cost, total cost of option. Logistics Supportability—Maintenance concept, storage, shipping and handling concept, and technical manuals. Management—Contractors' experience and past performance, adequacy of contractor and subcontractor facilities for the program, adequacy of management capability including system engineering, human engineering, safety, maintainability, etc., and management plan to include adequacy of overall program, plan and pertinent milestones. Again, the weight assigned to each factor is procurement sensitive.

VIPER

Senator **Goldwater**. Hasn't the emphasis been too heavy on the antitank capability of the Viper, doesn't it have other uses that are equally important?

Answer. True. It is a mistake to judge Viper only in terms of tank frontal armor penetration. While it does provide antiarmor protection for the rifle squad and other units not having organic antiarmor weapons, it is effective against bunkers, crew served weapons, trucks, reconnaissance vehicles, assault guns, personnel carriers, and self-propelled antiaircraft weapons. It is well suited for use against fortified positions and in built-up areas and is ideal for use on combat patrols against command posts, artillery, missile launching sites, communications centers, tank parks, supply depots, and airfields.

Senator GOLDWATER. How much money do you have in your fiscal year 1984 budget for Viper?

ANSWER. None.

Senator GOLDWATER. The Marines have something called SMAW, Small Assault Weapon. This has a reusable launcher. Have you looked at the SMAW? Compare it to the Viper.

ANSWER. The Army is following closely the Marine Corps Shoulder Launched Multipurpose Assault Weapon (SMAW) program. The SMAW is a "bunker buster," with a warhead designed by the Navy capable of breaching and destroying masonry/concrete and earthen/timber defensive positions. The weapon has a reusable launcher and the Marine Corps plan to use a dedicated gunner to employ the system. The Army does not have a requirement for a separate weapon to perform the SMAW mission. The Marine Corps SMAW weapon utilizes the Israeli B-300 launcher and propulsion system to which has been added a spotting rifle and optical sight. A comparison of Viper and the SMAW weapon follows:

	Viper	SMAW
Total weapon weight (pounds)	9.0	25
Carry length (inches)	27.5	30
Effective range (miles)	300	250
Tube caliber (millimeters)	70	83
Warhead	HEAT	HE
Disposable	Yes	No
Dedicated gunner	No	Yes

The technical characteristics above do not reflect the different uses of the weapon. Viper is designed to be an antitank/antiarmor weapon and the SMAW is designed to be a "bunker buster."

WHEELED VEHICLES

Senator GOLDWATER. I understand that your procurement contracts for wheeled vehicles generally contain options that would permit you to increase production rates if additional funds were made available. What options do you have in that regard? (List vehicle type, planned procurement quantity, budgeted amount, optional procurement quantity and additional funding required.)

ANSWER. If additional funding is made available, contract options could be executed for the vehicles shown below.

Type	Fiscal year 1984 budget		Additional option	
	Quantity	Amount	Quantity	Amount
CUCV	15,346	191.7	8,569	105.4
HMMWV	4,218	135.7	8,236	264.2
5-ton truck	4,499	373.2	4,366	[1] 392.7
Nontactical vehicles:[2]				
Pax carrying vehicle	2,141	21.9	5,980	[3] 67.5
General purpose	2,151	28.2	5,984	55.2
Special purpose	520	7.3	2,047	34.3

[1] Increase of option quantity required.

[2] These vehicles are procured off commercial production lines and are readily available. Increases shown would cover the most critical needs. Additional vehicles to be procured include; sedans, station wagons, pick-up trucks, maintenance truck, carryalls and flatbeds.

[3] If the above increase in passenger carrying vehicles is approved, the Army's fiscal year 1984 appropriation language will require amendment to obtain Congressional approval to procure the additional quantity.

To support the additional vehicles procured if the above options are exercised, additional funding for spare parts is required as follows:

Vehicle:	
CUCV	3.0

HMMWV	2.0
5-ton truck	10.1
Nontactical vehicles	NA

Senator **Goldwater**. Can you estimate the number of jobs that would be made available by exercising these options?

Answer. Estimating the number of jobs that would be made available by exercising these options would require knowledge not readily available to the government regarding current and forecast production loading, existing reserve capacity and the labor intensity of production processes for all contractors and subcontractors.

FAASV (FIELD ARTILLERY AMMUNITION SUPPORT VEHICLE)

Senator **Goldwater**. Last year the Congress approved $30 million for the first 54 FAASVs. Where do you stand on putting these vehicles on contract?

Answer. FASSV was type classified in mid-February. We have released the RFP and have received a response from the contractor, BMY, Corp of York, PA. We are currently evaluating the BMY proposal and plan to award a sole source contract in late April.

Senator **Goldwater**. As I understand your plan, you intend to buy one FAASV for each self-propelled artillery piece in Europe. Is that accurate; if so, how many are we talking about? Are you putting them in POMCUS?

Answer. The plan is to field one FAASV for each self-propelled artillery piece in Europe. We also plan to put FAASV in POMCUS. Deployment of FAASV includes:

Where:	*Total*
1 FAASV for each forward deployed M109 howitzer in Europe	504
1 FAASV for each forward deployed M110 8" howitzer in Europe	246
POMCUS (8" and M109)	[Deleted]
TDA	25
Floats and war reserve (Europe)	[Deleted]
Total, FAASV	1,464

Senator **Goldwater**. Why do you feel that you do not need FAASV in Korea or with the Rapid Deployment Force?

Answer. The Army has not made a determination that FAASV is not needed in Korea and the Rapid Deployment Force. The Army determination was that the most urgent requirement was to field FAASV in Europe. Funding constraints have limited the scope of the program.

Senator **Goldwater**. Are the Marines interested in buying the FAASV? If not, why not?

Answer. The Marines evaluated FAASV and determined that, for them, it was not affordable.

Senator **Goldwater**. Where do you stand with regard to M109 artillery pieces, do you have all that you need? (Provide details for the record to include a breakout of Guard and Reserve shortages).

Answer. The current Army Acquisition Objective (AAO) for M109 howitzers is 2,856. M109 procurement through fiscal year 1982, including the fiscal year 1982 procurement of 33 M109 howitzers for the National Guard, provides a total of 2,236 M109 howitzers. The fiscal year 1984 budget request includes an additional 619 howitzers to be procured in fiscal year 1984 through fiscal year 1988. The additional 619 howitzers will provide a total of 2,855 M109 howitzers. Note that there are no M109 howitzers being procured in fiscal year 1983.

Senator **Goldwater**. Compare the cost of the M 109 with the cost of a FAASV.

Answer. In fiscal year 1984 the Army has requested 217 FAASV for $104.7M, including $1.3M for initial spares, which is a unit price of $0.482M each and 112 M109A2 howitzers for $82.1M which is a unit price of $0.733M each.

GUARD AND RESERVE PROCUREMENT

Senator **Goldwater**. Provide for the record for the fiscal year 1984 budget, the following:

(a) A listing of all equipment being directly procured and the amount budgeted. (NG)

(b) Comparable listing for the Army Reserve.

General **Merryman**. The Army procures and addresses the equipment needs of the Reserve Components within the framework of the Total Army. The following tables show the quantities and dollars of the fiscal year 1984 procurement budget projected for distribution to the Army National Guard and the Army Reserve. This projection is based upon the quantities and dollars contained in the fiscal year 1984 President's Budget as of January 1983. Fiscal resources, programmatic, and priority changes subsequent to this date may result in changes to this projection.

Item	Quantity	Millions
National Guard		
Stinger	612	$55.9
M–577A2 carriers	42	8.4
Bradley FVS	91	120.7
M–109A2 155-mm Howitzer	22	16.1
M–88A1 recovery vehicle	144	113.8
M–1 tank	119	262.8
LAV–25	93	70.0
DIVAD gun	12	53.6
½-ton semitrailers	53	1.1
5,000-gal semitrailer	155	6.6
CUCV	4,908	61.8
5-ton trucks	39	2.9
AN/TTC–39	9	31.3
Sincgars	166	2.6
UGC–74 teletypewriter	340	3.7
Battery computer system	125	25.2
Computer, ballistics, mortar	518	5.7
Laser rangefinder AN/GVS–5	308	2.8
Night sight, infrared AN/TAS–5	469	17.1
Mask, protective NBC	7,903	1.5
Mine clearing roller	8	1.4
M–9 ACE	6	4.3
Shop equipment, original repair	24	5.2
Shop equipment, elec. repair	17	3.4
Motorized road grader	223	22.5
Earthmoving scraper	128	34.9
Generators	171	2.3
Forklifts	84	15.5
Other		8.3
Total		961.4
ARMY RESERVE		
Stinger	72	6.6
M–88A1 recovery vehicle	8	6.3
5,000-gal tank semitrailer	304	15.2
GUARD AND RESERVE PROCUREMENT		
CUCV	3,202	39.7
AN/TCC–39	4	13.9
Smoke generators M–3A3	280	2.1
AN/UGC–74 teletypewriter	599	6.5
Shop, electrical repair	27	5.3
Road grader	127	12.8
Scraper, earth moving	172	46.9
Truck, forklift 4,000 lbs	52	1.8
Battery computer system	18	3.6
Crane, 140-ton	3	2.4
Generators	107	5.2
Other		8.2
Total		176.5

Senator **Goldwater**. Provide for the record, a listing of equipment being procured for the Active Army that will permit release of equipment now in the hands of the Active Army so that it may be transferred to the Army Guard or the Army Reserve. (For example, the procurement of M1 tanks might allow transfer of M

60's to the Guard.) Show the equipment that the Guard and Reserve will acquire through this procedure and estimate the value of this equipment.

Answer. Items being procured for the early deploying units that will cause equipment currently on hand to be transferred to the Guard and Reserve are the M1 and M60A3 tanks, Bradley M2 and M3 Fighting Vehicles, Forward Area Ammunition Support Vehicles, Sergeant York Division Air Defense (DIVAD) gun, Lightweight Air Defense System, TACJAM MLQ/34 jamming system, Improved GUARDRAIL V intercept system and the AN/TTC-39 Tactical Automatic Switch. An illustrative list of items receiving intensive management that are planned to be displaced to the Guard and Reserve and the associated dollar values for this action are shown below.

EXAMPLE TRANSFERS OF EQUIPMENT FROM THE ACTIVE TO THE RESERVE COMPONENT

Nomenclature	Fiscal years			
	1983		1984	
	Number	Amount	Number	Amount
Airplane, utility U-21A, ARNG	2	$697,688		
Helicopter attack AH-1S, ARNG	33	51,427,761		
Combat vehicle antitank (ITV) M-901, USAR			3	$960,753
Carrier cargo 6T M-548, ARNG			48	5,108,400
Mortar, 81-mm M-29, USAR			280	2,518,890
Improved Chaparral air defense missile system, ARNG			12	13,932,936
Countermeasures set AN/GLQ-3B, USAR			6	3,916,500

Senator **Goldwater**. In your judgment, what are the highest priority unfunded equipment requirements, for the Guard and the Reserve?

Answer. The top two equipment priorities in the Guard today are air defense and communication items. Chaparral support, test, and training equipment procurement would be beneficial to complement the overall air defense upgrade. Flexibility also exists within the communication area to accelerate the pace of modern item procurement for Guard requirements.

Reserve priorities are aligned with their combat service support mission. Maintenance, medical, water supply point, and communication items of equipment, available from procurement, would constitute the highest Reserve priorities.

155-MM HOWITZER M109

Senator **Goldwater**. I note that you are procuring 112 new M109s this year. What are your out-year plans?

Answer. The out-year plans are to procure an additional 507 howitzers in fiscal year 1985 thru fiscal year 1988. This makes a total additional procurement of 619 howitzers in fiscal year 1984 thru fiscal year 1988.

Senator **Goldwater**. What is BMYs production capacity for M109s?

Answer. Recent lay offs at BMY have taken the M109 line to a minimum sustaining a production rate of about 20 vehicles per month.

INFANTRY CARRIER M113

Senator **Goldwater**. How long will the M113 production line remain open?

Do you need the M113 production space to ramp up production of the Bradley?

General **Merryman**. June 1986 if Congress approves the Army's fiscal year 1984 request for M113A2 and M577A2. June 1985 or earlier if there is no fiscal year 1984 buy (contingent on FMS and economics of producing at a very low rate).

Yes, common machine shop equipment/space would be used. However, the ramp up would not interfere with M113 production (or vice versa) at expected rates for M113 and BFV.

ACE

Senator **Goldwater**. Why do you need the ACE?

Answer. Our doctrine requires combat engineers to provide close combat support to the fighting force. The M9 equips combat engineers with the capability to provide the required support: reducing obstacles to ensure mobility, creating obstacles such as anti-tank ditches, and digging-in our critical combat systems. The M9 is also designed for the battlefield, with protection against artillery fragmentation, light machine gun fire and chemical/biological agents. There is no effective alternative to the M9 to meet the Army's requirement.

Senator **Goldwater**. I recognize the value of the bulldozer in digging in tanks and artillery. However, we've never had a bulldozer that could keep up with the tank. Why do we need one now?

Answer. The need for the M9 is not new. The deficiency caused by having only the bulldozer has always existed. As combat systems become more mobile and more lethal, the requirement for the M9, a mobile, survivable combat engineer support system, becomes more critical.

Senator **Goldwater**. What do we have to keep up with the M60?

Answer. As for all our equipment, all we have is the bulldozer which can neither move with the combat force nor survive on the battlefield. The need for the M9 is not related to any individual combat vehicle but rather to our doctrine of timely support to the fighting force. This deficiency degrades the effectiveness of our fighting forces.

Senator **Goldwater**. How do the Marines dig in?

Answer. The USMC relies on construction equipment or handtools for digging-in. The Marines are evaluating how best to equip Marine combat engineers for digging-in and for other support required for unique Marine amphibious assault operations.

9-MM PERSONAL DEFENSE WEAPON

Senator **Goldwater**. I note that you plan to begin buying a new 9mm pistol to replace the .45. What is the total scope of this program and which handgun will you buy?

Answer. An OSD directed study recommended a single family of handguns/ammunition and adoption of 9mm. A Joint Service Operational Requirement (JSOR) was approved 26 August 1982 by OSD and the Army was directed to conduct the program to select a standard 9mm handgun. The total service handgun requirement is approximately 531,000 weapons. All Services have submitted requests for procurement funds in the fiscal year 1984 budget (Army-11500/$3.9M; Navy-1100/$.5M; USAF-3000/$1.0M; USMC-6053/$2.0M) and the Army has validated Coast Guard requirements. If the Congress approves the Services' budget request, the Army will test, select, and procure a standard 9mm handgun for the Armed Forces. Afterwards, milestones for testing and procurement will be developed.

Senator **Goldwater**. This program was in trouble in the Congress in the past. Why do you want to proceed?

Answer. As the executive agent, the Army has objected to proceeding with a program which has received both strong support and equally strong opposition from the congressional committees. However, we have been recently directed to proceed by OSD.

AVLB (ARMORED VEHICLE LAUNCHED BRIDGE)

Senator **Goldwater**. Why are you proposing to build new AVLB's?

Answer. The Army presently has procured 675 Armored Vehicle Launched Bridges through new production or conversions. This quantity represents 35 percent of the Armored Vehicle Launched Bridge requirement for 1,953 systems. Our fiscal year 1984 plan is to procure kits to convert 48 M60A2 tank chassis to Armored Vehicle Launched Bridge chassis and procure 58 bridges (a factor of 1.2 bridges per chassis).

Senator **Goldwater**. What are your out year plans for building Armored Vehicle Launched Bridges?

Answer. We currently plan to complete conversion of the remaining M60A2 chassis (454) to Armored Vehicle Launched Bridge chassis during the fiscal years 1985 through 1988 period. This will make best use of the available M60A2 chassis while providing needed Armored Vehicle Launched Bridges. This program, when completed, will increase our Armored Vehicle Launched Bridge inventory to about 60 percent of our requirements without resorting to costly new production.

DIVAD

Senator **Goldwater**. Briefly review the DIVAD gun. (b) What are its capabilities? (c) Why do we need it? (d) Where does it stand in the procurement cycle? (e) How much does it cost?

Answer. In response to an urgent need for a weapon system to protect main battle tanks and other Divisional Maneuver elements against armed attack helicopters and high performance ground attack fixed-wing aircraft, the Army initiated a competitive development program in 1978. Based on proposals submitted by five major defense contractors, the Army selected two contractors, General Dynamics and Ford Aeronutronics Division, to develop two prototypes each for design and operational testing. After completion of prototype testing and evaluation of production proposals, the Army selected Ford to proceed into initial production. The contract awarded Ford in May 1981 was for a base fiscal year 1981 contract for research and development maturity effort, facilitization for production, and long lead item procurement with three pre-negotiated production options for fiscal years 1982, 1983, and 1984, all on a Fixed Price Incentive Fee (FPIF) basis. The Fixed Price Incentive Fee type contract applies a reasonable but fixed upper limit on costs and causes the prime contractor to share in a major portion of the risk. This contract calls for a total quantity of 276 Sergeant York systems with associated ammunition, trainers, peculiar support equipment, training, facilities and testing. The balance of 342 systems required will be procured commencing in fiscal year 1985.

The Sergeant York System has been designed to provide air defense of our forward maneuver elements against both the rotary wing and the fixed wing threat. As such, its capabilities can be summarized as follows: adequate effective range to defeat the threat; armor protection to survive artillery fragments, small arms fire, and blast warheads; quick reaction time to deliver ordnance before the aircraft is able to do so; mobility to keep up with the other combat vehicles in the force; a fire control system utilizing radar, to provide target acquisition and engagement capability under varying conditions of visibility; good performance in an electronic countermeasures environment; etc.

A combination of guns and missiles provides a cost effective approach to the wide variety of threat aircraft and tactical situations encountered by the field Army. Each system meets specific needs and collectively they are more effective than a choice of guns or missiles.

Guns directed by modern fire control systems are deadly and have good all aspect capability. The combination of an accurate fire control solution, short time of flight, proximity fuzing, and a lethal warhead make gun systems such as Sergeant York, highly effective in the air defense role. The large ammunition capacity permits having more stored kills on the carrier than are practical with missile systems. All of the stored ammunition is available for use without delays for reloading to the ready to fire position. These are important distinctions compared with any air defense missile system currently available. This capability to engage a succession of enemy aircraft is very important to counter the aircraft raid intensity expected in Europe and other areas. The Sergeant York, for instance, carries 502 rounds ready for fire. With its economical firing schedule and highly effective rounds, more than 20 engagements are expected before reloading.

Additionally, Sergeant York is equipped with a search and track radar which gives it all weather capability with autonomous target and acquisition, thus eliminating target vectoring problems associated with less capable systems. This also results in extremely fast reaction time from target unmask, and although the exact value is classified, I can inform you that it is sufficiently rapid to engage and destroy a pop-up helicopter before it can guide an antitank missile to a target. Not to be overlooked is its mobility afforded by the tracked chassis and armored turret that is capable of defeating heavy machine gun fire and fragments from a near miss by a large artillery shell.

Gun systems designed for air defense also become dual purpose weapons, suitable for aircraft and ground targets. This ground target capability can be very valuable for field commanders, particularly when these air defense gun systems are employed with heavy mechanized divisions.

The cost per kill is typically an order of magnitude less for a modern, fire control directed gun system than a short range air defense missile system.

The Government has exercised Option *1* of the contract with Ford, which requires delivery of 50 Sergeant York Gun Systems together with ammunition, trainers, peculiar support equipment, training, facilities, and testing. Procurement unit cost in fiscal year 1984 dollars is $4.1M.

Senator GOLDWATER. What capability do the Russians have to attack the DIVAD?

ANSWER. The Soviets are expected to employ attack helicopters and fixed wing aircraft against forward Division area targets, both directly against the Sergeant York system and against other targets in the same region of the battlefield. The Sergeant York will also be within range [deleted]. The York system is armored such that unguided artillery rounds are not expected to be effective in attacking or suppressing the system. Aircraft, as well, are expected to be utilize guided as well as conventional ordnance to attack the York and/or the combat maneuver elements it supports. Extensive analyses of threat capability and tactics have been analyzed, and the Sergeant York is expected to have adequate capability for self-defense, and for the effective defense of the supported force. In particular, the range capability of the system is expected to be adequate to defeat the attack helicopter which employs stand-off tactics to the maximum possible degree.

Senator **Goldwater**. Does the HIND helicopter have the capability to take on the DIVAD with anti-radiation missiles?

Answer. Since the Sergeant York system employs a search radar for target detection, careful consideration has been given to the vulnerability to attack by the Anti-Radiation Missile (ARM). The original requirement documents stated that at least [deleted] probability of surviving a single ARM engagement was required.

The Sergeant York is designed to Survive ARM's via armor protection on the entire vehicle, and [deleted]. If a missile target is declared, an immediate sequential process would occur: [Deleted].

This sequence of events has been tested, with some corrections being required for the proper classification of missile targets (and prevention of false alarms), and the exact timing of the shutdown sequence. Additional testing of the refined software will occur in mid fiscal year 1983. Even in earlier testing, the Army's independent evaluation agency (Army Materiel Systems Analysis Activity) determined that the York system had greater than a [deleted] single ARM engagement survivability.

Additional techniques for ARM survival are also expected to be available in the future [deleted].

Senator **Goldwater**. Provide for the record and discuss: (a) Your 5-year funding profile for the DIVAD as now planned, (b) A funding profile for DIVAD assuming it is canceled in mid-1983.

Answer.

SERGEANT YORK GUN SYSTEM PROGRAM COST PROFILE—FISCAL YEAR 1984 PRESIDENT'S BUDGET AS OF MAR. 16, 1983

	Fiscal year—							Total
	1982 and prior	1983	1984	1985	1986	1987	1988	
Fire unit quantity	50	96	130	132	144	66	0	618
RDTE	$223.7	$10.9						$234.6
WTCV	472.6	539.9	$580.2	$542.5	$434.3	$243.5	0	2,813.0
Spares	36.3	78.4	90.9	88.2	107.0			400.8
Ammo	68.8	48.9	109.0	109.0	123.0	101.8	$30.9	591.7
MCA	0	15.0	30.5	32.7	6.1			84.3
Total	801.4	693.1	810.9	772.4	670.4	345.3	30.9	4,124.4

SERGEANT YORK SYSTEM PROGRAM COST PROFILE FUNDING PROFILE ASSUMING PROGRAM CANCELLATION IN MID-1983 (ASSUMES AWARD OF OPTION II—MAY 1983) AS OF MAR. 16, 1983

	Fiscal year—		Total
	1982 and prior	1983	
Fire Unit quantity	50		50
RDTE	[1] 256.7	10.9	267.6
WTCV	[2] 482.6	[3] 150.0	632.6
Spares	36.3	[3] 24.0	60.3
Ammo	68.8	[3] 15.0	83.8
MCA	0	[3] 3.0	3.0
Total	844.4	202.9	1,047.3

[1] Includes $33M reporgramed fund (fiscal year 1982).

[2] Includes $10M underthreshold reprogramed fund (fiscal year 1982).

[3] Estimates.

The present 5-year profile executes the program with only 2 percent real cost growth since our 1978 estimates. The cancellation of DIVAD at this time would result in a sunk cost of $1 billion and the delivery of approximately 50 fire units. These fire units would equip only approximately one battalion and would require considerable operating and maintence costs.

NATIONAL GUARD AIR DEFENSE

Senator GOLDWATER. What kind of air defense capabilities do our National Guard Divisions have?

ANSWER. Our National Guard Forces currently have only one system: (1) The Duster—the twin 40mm, optical-directed, open-turreted, self-propelled system of World War II vintage. The 40mm system utilizes a gun and ammunition subsystem of earlier design than the Sergeant York system—ammunition is at lower performance and not interoperable.

PIVAD

Senator GOLDWATER. What is PIVAD?

ANSWER. The PIVAD refers to the Product-Improved Vulcan Air Defense System [PIVADS]. There are a number of different ways for potentially improving the Vulcan Air Defense system (VADS) including an improved computer, shorter flight time ammunition, improved reliability, ranging laser in lieu of range-only radar, etc. A current development effort has been funded to examine an improvement option, primarily aimed at the towed VADS, which will not be replaced by the Sergeant York system. Various versions of improved Vulcan Air Defense System systems have been considered as options for air defense protection in the future. Shortcomings include the lack of adequate effective range (because of the 20mm projectiles long flight times and inadequate terminal effects, range is limited to less than or equal to [deleted], insufficient armor protection for survival in the forward Division area, lack of adequate target acquisition means, insufficient mobility, and other factors. The first of these shortcomings is the most serious when considereing the stand-off helicopter threat, and the ordnance release distance of fixed wing aircraft attacking Vulcan Air Defense System defense assets.

Senator GOLDWATER. Compare PIVAD to DIVAD, especially cost.

ANSWER. Product-Improved Vulcan Air Defense System, even in the most upgraded version, continues to sufffer from: (1) Inadequate effective range, (2) Inadequate reaction time because of no target acquisition sensors, (3) Inadequate survivability because of the open turrent configuration, and (4) Various other shortcomings. The PIVADS would not be fielded on the schedule now forecast for the Sergeant York System. The PIVAD system is clearly much less expensive than DIVAD. The unit cost is approximately $130,000 to upgrade a VULCAN system, compared to the $4.1m cost of DIVAD. But since the PIVAD can't perform the mission required the savings in money are meaningless. We cannot afford to leave the tank and fighting vehicle force without air defense protection.

Senator GOLDWATER. Has the Army looked at canceling the DIVAD and substituting the PIVAD? What are the pros and cons?

ANSWER. The PIVADS has been looked at as a Sergeant York [DIVAD] alternative on several occasions. Even though the PIVAD upgrade could be accomplished for considerably less investment costs than the Sergeant York, the PIVADS system is totally incapable of saving any of the M1/M2/M3 and other forward Division assets in a war scenario. The primary reason, is that PIVADS lacks effective [deleted] to defeat the stand-off attack helicopter.

Senator GOLDWATER. Provide for the record optional funding profiles for the Product-Improved Vulcan Air Defense System to include an accelerated fielding schedule option as well as an optimum fielding option.

ANSWER. The current funding profile for Product-Improved Vulcan Air Defense System is:

	Fiscal year—				
	1984	1985	1986	1987	Total
RDTE	5.32	0	0	0	5.32
Proc	9.3	33.7	28.0	0	71.0
Quantity	39	241	229	0	509

This provides self-propelled PIVAD to the National Guard and towed PIVADS to the light forces (active) beginning in fiscal year 1986. This profile supports a split in the procurement between self-propelled Vulcan modification kits and towed Vulcan kits. An increase in $29 million up-front fiscal year 1984 procurement funding would allow modificaiton of the self-propelled systems for the Naitonal Guard on schedule, while providing the active forces an early PIVADS capability, and allowing us to exercise our contract option with Lockheed Electronics Company.

Senator **Goldwater**. Are there other options to the DIVAD that should be considered?

Answer. The options that are presently available in lieu of DIVAD have been previously considered. In the mid to late 70's, a number of force structure studies were conducted in order to determine the most cost effective solution to the air defense of our Army's forward divisional elements. among the options considered were [deleted]. The DIVAD Gun system has emerged from these studies as the most cost/effective solution for forward area air defense. The shorter range gun systems with optical-only fire control suffer from limited range capability and long reaction times. All missile options are relatively longer in reaction time, more subject to countermeasures, and more sensitive to visibility conditions on the battelfield, since they depend on optical sensors.

DIVAD

Senator **Goldwater**. The Marines plan to make do with substantially less air defense capability than the Army. Recognizing that the Marines have organic aircraft that fives them an air defense dimension that the Army may not have, their ground air defense systems consist of only Stinger and Hawk. The Army has Stinger, Vulcan, Chapparal Hawk and soon Patriot. Now you are adding division air defense (DIVAD). Compare briefly (and expand for the record) on your air defense philosophy versus that of the Marines. Why such a disparity between the Services?

Answer. Both the Army and the Marine Corps have the mission requirement to provide adequate air defense for the forward manuever units. The primary reason why we configure our units differently, in terms of air defense systems, is the need for the Marine Corps to be light and capable fo rapidly deploying. The DIVAD Gun is a system that is simply too heavy to be part of the Marine Corps mobile force. The Army, on the other hand, has to be configured both in a light configuration and at the same time capable of fighting the heavy division battle.

Senator **Goldwater**. Have the Marines approached you about buying DIVAD?

Answer. No, the Marine Corps has not approached the Army concerning the DIVAD Gun by this is not because the Marine Corps would not like a system as effective as DIVAD but strictly because DIVAD is too heavy to meet their mobility requirements.

Budgeting for Army R&D

Senator **Goldwater**. Explain how you decide on the amount of money that will be budgeted for Army R&D.

Answer. A determination as to the amount of money in the Army's RDTE budget begins with an analysis of several factors. Some of them are as follows:

a. Congressional guidance as indicated by their changes to the previous year's budget.

b. The President's budget from the previous year.

c. OSD guidance.

d. Analysis of the threat.

e. The Army's Long Range Research, Development, and Acquisition Plan.

f. Input from the Army Major Commands.

Based on the above factors the Army conducts an annual review of its five year program and long range plan. Each RDTE program is reviewed against current evaluation of the threat, the future environment, and current and future concepts of operation. Affordability considerations are made based on OSD and Army guidance and a detailed prioritization process including comparison with all other Army funding requirements. The program is then reviewed by successive levels within the Army and OSD. The net result of this process is the Army's RDTE budget request.

Senator **Goldwater**. How do you allocate resources within your R&D ceiling?

Answer. Resources are allocated based on a review of each program, its relative priority within the Army's Long Range Research, Development, and Acquisition Plan, and its relative priority against other Army needs. Programs are reviewed by successive levels within the Army and OSD resulting in a specific allocation of funds to each program element and project.

Senator GOLDWATER. What rate of inflation was assumed by your R&D account for fiscal year 1984 over fiscal year 1983?

ANSWER. The fiscal year 1983–84 inflation rate provided by OSD to the Army for the 1984 R&D appropriation was 5.3 percent.

Senator GOLDWATER. Provide a listing of fiscal year 1984 outlay estimates for each R&D program element.

Answer. 1. The outlays for the RDT&E,A appropriation are computed at the appropriation level, not by program element.

2. The outlay formula is based upon historical data. The formula used for computing outlays in fiscal year 1984 is as follows:

First year	55
Second year	35
Third year	7
Fourth year	1.93

Senator GOLDWATER. Discuss the philosophy that the Army has with respect to research in-house versus research by others.

ANSWER. Army policy is to maintain a balance of funding in the 6.1 program to allow the Army in-house labs and its network of contract researchers from academia and industry to address specific Army deficiencies and needs. In recent years (fiscal year 1977 to present) the Army has made a deliberate effort to increase contract research, especially with universities. This policy is reflected in the Army Research Office budget which has grown by an average of $10M per year in the last three years. In-house and contract 6.1 funding for the years in question is as follows ($M) for P.E. 61102A:

	Fiscal year—		
	1982	1983 (estimate)	1984 (estimate)
In-house	87.2	99.3	107.8
Contract	70.5	81.2	91.4
Total	157.7	180.5	199.2

Senator GOLDWATER. Discuss the philosophy that the Army has with respect to research by industry versus research by academia.

ANSWER. Army policy is and has been to get needed contract research done by the best possible source. Therefore, there is no conscious policy to discriminate between academia and industry in 6.1 research. However, the nature of the marketplace is such that much more basic research is done in academia and the Army expenditures for contracts in the research program reflect that fact. The funding for industry versus academia is as follows for P.E. 61101A, 61102A (funding in $M):

	Fiscal year—		
	1982	1983 (estimate)	1984 (estimate)
Academic and not-for-profit Institutes	56.9	65.9	74.1
Industry	13.6	15.3	17.3
Total	70.5	81.2	91.4

Senator GOLDWATER. Briefly describe each major Army technology thrust, discuss its origin, and the program elements included in each.

ANSWER. The Army Science Board and Defense Science Board identified some leverage technologies during their summer studies of 1981. Leverage technologies are those in which we have a national lead and have application on the battlefield. These technologies offer the potential for innovative, near-revolutionary change in military systems and capabilities. The major Army technology thrusts are designed to integrate, focus, and apply leverage technologies to solve the most demanding problems of Airland Battle 2000.

2. *Very Intelligent Surveillance and Target Acquisition [VISTA].*—Technologies will provide commanders dramatically improved targeting information in near real time through the incorporation of enormous computational power and data processing capabilities into individual sensors and combinations of sensors. Program Elements which contribute part of their efforts to VISTA are: 622111; 62120; 62201; 62202; 62617; 62703; 62705; 62706; 62709; 62715; 63220; 63710; 63725; 63742; 63762.

3. *Distributed Command Control Communications and Intelligence [DC^3I].*—Technoligies will dramatically improve reliable distribution of battlefield information among all levels of command. The Program Elements that contribute whole or part to DC^3I are: 62202; 62701; 62746; 63207; 63221; 63324; 63707; 63631.

4. *Self-Contained Munitions (SCM).*—Technologies will allow munitions to independently search out, select, and home on hostile targets. Program Elements which contribute part of their effort to SCM are: 62303; 62603; 63206; 63306; 63313; 63322.

5. *Soldier-Machine Interface [SMI].*—Technologies will imrpve training, expand individual capabilities, and make it easier for soldiers to operate sophisticated equipment. The Program Elements which contribute in whole or part to SMI are: 622202; 62209; 62716; 62717; 62722; 62727; 62777; 63207; 63209; 63211; 63216; 63731; 63739.

6. *Biotechnology.*—Offers the opportunity to assist in the prevention and treatment of casualties through new cleases of vaccines, antidotes, and treatment compounds. The Program Elements which contribute part of their effort to biotechnology are: 61102; 62706; 62770; 62775; 63763.

Senator GOLDWATER. Provide background information on the Army Science Board, who are members, what is its charter, how does it function, and how are cost paid.

ANSWER. Attached are a list of members, a charter, an Information Sheet which describes the function, and the Army Regulation which includes provision for costs, paragraph 9.

[Membership list retained in committee files.]

CHARTER OF THE U.S. ARMY SCIENCE BOARD

A. *Official designation.*—United States Army Science Board.

B. *Objectives and scope.*—To advise the Secretary of the Army, the Chief of Staff, the Assistant Secretary of the Army (Research, Development and Acquisition), the Deputy Chiefs of Staff, and major Army Commanders on scientific, technological, and acquisition matters of interest to the Department of the Army.

C. *Duration.*—The Board is established for a period of two years. At the end of each period, a determination will be made in accordance with applicable regulations as to the continuation of the Board.

D. *Reporting.*—The Board reports to the Secretary of the Army through the Assistant Secretary of the Army (Research, Development and Acquisition).

E. *Supporting agency.*—Office of the Secretary of the Army.

F. *Duties.*—The Board is the senior scientific advisory group and advises the Secretary of the Army, the Chief of Staff, the Assistant Secretary of the Army (Research, Development and Acquisition), the Deputy Chiefs of Staff, and major Army Commanders on scientific, technological, RDTE and acquisition matters of interest to the Army.

G. *Estimated annual operating costs.*—1. Annual cost to operate: $500,000; 2. Man-years of effort: 6.

H. *Number and frequency of meetings.*—The Board will meet at least twice a year. The meetings will be held at the call of the chairperson, as appropriate. Ad hoc subgroups, quick reaction review groups, and study groups fo the Board will meet as required, at the call of the appropriate chairperson.

I. *Termination date.*—Two years from the date this charter is filed with the Congress.

J. *Composition.*—1. The Board will consist of—

a. Not more than 100 members (non-DOD personnel), to be selected on the basis of their preeminence in the fields of science, technology, engineering, testing, acquisition and management. A member will serve a term not to exceed two years, and may be reappointed consistent with departmental policy.

b. A Chairperson and a Vice Chairperson are selected from the membership by the Assistant Secretary of the Army (RDA) and approved by the Secretary of the Army. The Chairperson and Vice Chairperson shall assign board members to specific tasks, as required, and review and approve all reports prepared by the ASB in response to Army stated Terms of Reference.

c. The Executive Director, who shall be a senior Army official designated by the Assistant Secretary of the Army (RDA). The Executive Director shall be an ex officio member of the Board.

2. Ad hoc subgroup, review group, and study members are drawn as required from the Board at large, on the basis of expertise and availability.

K. *Subcommittees.*—Ad hoc subgroups, quick reaction review groups, and study groups will be established for specific requirements in accordance with the basic mission of the ASB.

L. *Date charter filed.*—October 1, 1982.

GENERAL INFORMATION SHEET

The Army Science Board [ASB], as the senior scientific advisory committee to the Secretary of the Army and the Chief of Staff of the Army, provides advice concerning major Army programs, reviews critical problem areas, acts in an ambassadorial role with commerical research and development activities, and consults regarding scientific and technical matters. The Board functions under the direction of the Assistant Secretary of the Army (Research, Development and Acquisition) and the Principal Deputy Assistant Secretary of the Army (Research, Development and Acquisition) (PDASA(RDA)). They are assisted by an appointed Executive Director. A Chairman and a Vice Chairman are appointed by the Secretary of the Army from the membership of the ASB.

Nominations for membership are reviewed and approved by the PDASA(RDA). Individuals approved for nomination are then informally contacted to determine their agreement to serve prior to formal notification. Appointment as a member of the ASB is the result of administrative action by the Office of the Secretary of the Army Civilian Personnel Office and Department of the Army [DA] Committee Management Office; approval by the Secretary of the Army; and review by the Office, Secretary of Defense. Prior to final appointment approval and swearing in, member-designees will not perform any advisory services for the ASB. Members, except those who are Federal (non DoD) employees, are concurrently designated as consultants to the Army upon approval of their membership appointments. Individuals who, because of personal preference, company policy, or concurrent government status, do not desire or are ineligible for reimbursement for their services, are appointed as members without compensation [WOC]. Eligible individuals who desire compensation for their services are appointed consultants when actually employed (WAE). The daily rate for such compensation is based upon a General Schedule Wage scale comparable to the consultant's annual income.

Appointment approval is accomplished by submission and review of the following:

SF 173 (Job Qualifications Statement) with resume;

DD Form 1555 (Confidential Statement of Employment and Financial Interests) and Disqualification Statement;

DD Form 1787 (Report of DoD and Defense Related Employment);

SF 61-B (Declaration of Appointee);

Waiver of Compensation Form or Form W-4 and State Tax Statement; and

Certificate for Custody and Safekeeping of Classified Defense Material (may await granting of security clearance); members without secure, appoved storage facilities may store classified material with the ASB Secretariat.

Upon final appointment, Board members are eligible to consult up to 60 days during each appointment year. Travel time is included in this figure. Under exceptional circumstances, additional days may be authorized. If under these exceptional circumstances a member will consult for more than a total of 60 work days within one calendar year, Standard Forms 278 and 278A "Financial Disclosure Statements" must be completed in accordance with the Ethics in Government Act of 1978 (PL 95-521, October 26, 1978).

While membership is approved for a term of two years, consultant status is valid for only one year. The entire Board is therefore reviewed and renominated annually at each member's appointment anniversary date. Membership changes may occur to accommodate a shifting emphasis in scientific disciplines. Consistent with DA policy, appointments will be restricted to no more than two 2-year terms, with a single term preferred. Only under exceptional circumstances and with specific justification will this restriction be waived.

All ASB members are required to have a current Army SECRET clearance since the bulk of the Board's business is of a classified nature. Processing of the security clearance is accomplished through the preparation of a Statement of Personal History (DD Form 398) which be forwarded to the member-designee by the Army Staff Personnel Security Office (TASPSO).

Meetings are generally held at locations appropriate to the subject discussed or at a place convenient to the majority of the members. In addition to panel, review, and ad hoc subgroup meetings, the ASB holds two general membership meetings each year; these meetings provide information on current activities of the Board and an overview of the hosting facility. To facilitate travel by ASB members, blanket travel orders are issued which are valid for a period of one year. These orders cover all travel within the Continental United States. Travel outside the Continental United States requires issuance of invitational travel orders. All proposed travel must be approved in advance by the ASB Executive Director.

Topics for formal examination or assessment by panels or subgroups are suggested by senior Army officials (Secretary, Assistant Secretaries, Chief/Vice Chief/Deputy Chiefs of Staff, Major Commanders) and approved by the PDASA(RDA). Member participants are approved by the Executive Director and the PDASA(RDA). For each activity, a letter from the PDASA(RDA) to the Chairman of the ASB will be prepared and staffed within the Army by the Executive Director to ensure that advice will focus on critical problems in major Army programs. The Army Staff provides a Staff Assistant to work with each group. Formal reports are submitted by each group to the ASB Chairman.

Immediate problems concerning specific technical programs may be reviewed by generally smaller groups or individual members on a less formal basis. To provide a quick reaction, the Executive Director will clarify the program aspects to be reviewed and, acting for the PDASA(RDA), send letters to appropriate members asking for their participation. The PDASA(RDA) will be kept informed of reviews by the Executive Director. Similarly, the Executive Director may ask individual members to participate in routine annual reviews or judging, such as the critique of Army Science Conference submitted papers. Letter reports are usually prepared for such reviews.

Support is provided by the ASB Secretariat. Members are normally responsible for making their own travel arrangements, submitting vouchers for travel, and general administration (e.g., report preparation, membership form completion); certain group activities (e.g., overseas travel) are completely supported by the ASB Secretariat. Advice and assistance can be obtained by contacting this office.

The ASB Secretariat is located near the Mall entrance (North side) of the Pentagon; you may enter either Room 2E673 or Room 2E661. Phone numbers are (202) 697-9703 and 695-3039. Correspondence should be addressed as follows: Army Science Board, Office Assistant Secretary of the Army (Research, Development and Acquisition), Pentagon 2E673, Washington, D.C. 20310.

*AR 15-8

ARMY REGULATIONS }
No. 15-8 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC *15 December 1980*

BOARDS, COMMISSIONS AND COMMITTEES

ARMY SCIENCE BOARD

Effective 15 January 1981

This revision reflects changes in the composition of the Army Science Board's (ASB) Executive Review Board. The DA Committee Management Officer concurs in the continuance of this committee. Local supplementation of this regulation is prohibited, except upon approval of the Assistant Secretary of the Army (Research, Development, and Acquisition) (ASA(RDA)). Requests for exception will be sent, with justification, through command channels to HQDA (SARDA-ASB), WASH DC 20310.

Interim changes to this regulation are not official unless they are authenticated by The Adjutant General. Users will destroy interim changes on their expiration dates unless sooner superseded or rescinded.

	Paragraph
Purpose	1
Applicability	2
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ASB secretariat	5
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1. Purpose. This regulation sets forth the mission, composition, and concept of operations of the ASB.

2. Applicability. This regulation applies to the Active Army and the US Army Reserve. It does not apply to the Army National Guard.

3. Mission. The ASB is the DA senior scientific advisory body whose mission is as follows:

a. Advise the Secretary of the Army (SA), the Chief of Staff, Army (CSA), the Assistant Secretary of the Army (Research, Development, and Acquisition) (ASA(RDA)), the Army Staff, and major Army commanders on scientific and technological matters of concern to the Army Research, Development, Test, Evaluation, and Acquisition (RDTEA) Program.

b. Make recommendations in these areas.

4. Composition. Membership on the ASB will be by invitation of the SA. Members will be selected and appointed in the following manner:

a. ASB members will be Federal employees or civilians from the scientific, engineering, and industrial communities. DOD employees may not serve.

b. Not more than 30 members and not more than 60 associate members will serve on the ASB. The number will be based on the ASB mission.

c. The SA will appoint a chairperson and a vice-chairperson from the ASB membership.

d. Members and associate members who are not Federal employees are concurrently designated consultants to the ASB upon approval of their appointments by the Office of the Secretary of Defense (OSD). Such members will be appointed to a 2-year term. They may be appointed to an additional term consistent with DA policy.

e. The ASB executive director will serve ex officio as a member of the ASB. The executive director is the designated Federal employee required by the Federal Advisory Committee Act (FACA) (5 U.S.C. app I).

5. ASB secretariat. *a.* The ASB secretariat consists of the executive director and assistant executive director. These officials are appointed by the ASA(RDA). Other persons will be assigned as needed.

b. The ASB secretariat provides—

(1) Guidance and administrative support to the ASB on meeting locations, internal organization, and membership.

(2) Long-range direction for the ASB's participation in the Army's research, development, and acquisition program.

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*This regulation supersedes AR 15-8, 15 August 1979.

6. ASB Executive Review Board. The function of this board is to assist the ASA(RDA) in reviewing study proposals. It is made up of the following:

a. ASB executive director, who serves as the chairperson.

b. Deputy Under Secretary of the Army (Operations Research).

c. Deputy Commander for Materiel Development, US Army Materiel Development and Readiness Command.

d. Deputy Commander, US Army Training and Doctrine Command.

e. Deputy Commander, US Army Forces Command.

f. Deputy Chief of Staff for Research, Development, and Acquisition (DCSRDA).

g. Director of Requirements, Office of the Deputy Chief of Staff for Operations and Plans.

h. Other DA officials.

7. Meetings. *a.* The ASB will meet at least annually. Additional meetings may be held when required. All meetings will be at the call of the chairperson and with the concurrence of the executive director.

b. The ASB Executive Review Board will meet at the call of its chairperson.

8. ASB ad hoc subgroup (AHSG) studies. The ASB will perform most of its advisory functions through AHSG studies. When requested and approved by the executive director, an individual member or associate member may also advise Army elements on RDTEA. When a study sponsor needs advice on a problem, the following procedures apply in forming an AHSG:

a. The sponsor will insure that—

(1) Any previous study on the problem was not adequate.

(2) The problem is not currently under examination elsewhere.

b. The sponsor will submit the questions through the ASB executive director to the Executive Review Board.

c. An Army civilian or military staff assistant will be assigned to the AHSG by the Director of the Army Staff, OCSA. This person will be the designated Federal employee required by FACA Section 10(e).

d. Reports on the ASB's advisory activities will be made at each of its scheduled meetings.

e. ASB AHSG meetings constitute Federal Advisory Committee meetings for the purposes of the FACA (5 U.S.C. app I).

9. Direction and control. *a.* SA ASB responsibility is delegated to the ASA(RDA).

b. The chairperson of the ASB will report through the executive director to the ASA(RDA).

c. Travel and per diem costs will come from research, development, test, and evaluation (RDTE) funds provided by ODCSRDA. Consultant fees are funded by the SA.

10. Public inspection of board documents. The public may inspect and copy any papers prepared by or for the ASB, subject to the exemptions set forth in the Freedom of Information Act (5 U.S.C. 552b). These papers are available in the Office of the ASA(RDA), The Pentagon, WASH DC 20310.

The proponent agency of this regulation is the Office of the Assistant Secretary of the Army (Research, Development, and Acquisition). Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to HQDA (SARDA–ASB), WASH DC 20310.

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

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ARNG: None
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QUESTIONS SUBMITTED BY SENATOR EDWARD M. KENNEDY, ANSWERS SUPPLIED BY DR. J. R. SCULLEY, ASSISTANT SECRETARY OF THE ARMY (RD&A); AND LT. GEN. J. H. MERRYMAN, U.S. ARMY, DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT, AND ACQUISITION

DIVAD

Senator KENNEDY. As I understand it, questions from other Senators about the DIVAD gun during the first day of this hearing established that the Soviet HIND Helicopter armed with the [deleted] [deleted] missile can launch this missile outside the effective range of the DIVAD. Is that correct?

ANSWER. The HIND-E Helicopter and the Follow-on Attack Helicopter FAH] are usually attributed with Anti-Tank-Guided Missiles [ATGMs] with [deleted]. However, all studies and tests indicate that the achieved stand-off range under operational conditions will be much less than the theoretical range capability of a missile guidance link. The latest threat estimate for the Sergeant York program, which has received validation by the Defense Intelligence Agency [DIA], estimates the achieved operational stand-off ranges in the mid to late 1980s to be from [deleted]. In most cases this is within the effective range capability of the Sergeant York system. Although there may be a few situations when aircraft will be able to achieve maximum stand-off, the following factors will tend to limit operational stand-off capability: The degree of prior knowledge of target location, comouflage of the ground target, defensive versus offensive scenarios, efficiency of communication between attack aircraft, and the general confusion of a multiple gun/multiple aircraft battlefield.

Senator KENNEDY. Dr. Sculley, compared with the Vulcan Air Defense Gun that the DIVAD is to replace, what are the relative unit costs and capabilities of DIVAD? In your answer include the costs and capabilities of the Product-Improved Vulcan System.

ANSWER. The Vulcan system which is being replaced by the DIVAD gun in our heavy divisions is less costly than DIVAD. We are no longer procuring the basic Vulcan systems but unit cost estimates are approximately $1 million per system for the self-propelled system. DIVAD has a unit cost of $4.1 million in fiscal year 1984 dollars. The Product-Improved Vulcan modification adds approximately $130,000 to the cost of the basic Vulcan System. Despite this obvious disparity between the costs we feel that DIVAD is the most cost effective system because it has the capability to adequately perform the mission. Vulcan has inadequate range and reaction time as well as not being survivable in the forward area. DIVAD, on the other hand, has the rapid reaction time and range to engage the threat. DIVAD is designed to provide adequate air defense to both the Abrams tank and the Bradley Fighting Vehicle.

NEW ARMY DEVELOPMENT PROGRAMS

Senator KENNEDY. General Merryman, would you briefly describe the relationship among several new Army development programs—The All Source Analysis System [ASAS], The Joint Surveillance and Targeting Radar System [JSTARS], and the Joint Tactical Missile System [JTACMS]?

General MERRYMAN. Each commander has a number of sensors at his disposal, to include some from other Services. These systems allow us to see to the depth of the battlefield and acquire those pieces of information which will, when processed, assist in the commander's decision process. The systems must be sufficiently versatile to detect, identify, evaluate and attack a diverse target array.

The Joint Surveillance and Target Attack Radar System [JSTARS] will have the capability to locate and track moving targets beyond ground line of sight with sufficient accuracy for attack. Data from this and other imagery sensors will be combined with data from air and ground sensors and other combat information sources to give the commander a dynamic composite picture of enemy structure and behavior, through a fusion process.

Fusion is the process in which inputs from sensors and other elements are evaluated, analyzed, correlated, integrated, and disseminated as target nominations and reports. the Army automation system at division, corps, and echelons above corps supporting the fusion processes is the All Source Analysis System [ASAS], a capability being developed in the Joint Tactical Fusion Program [JTFP]. Sensors feeding the ASAS at the various echelons provide the basis for ground maneuver and fire support targeting within the battle area.

The Joint Tactical Missile System [JTACMS] is a weapon responsive to the ground commander, capable of striking high payoff targets in a timely manner, day or night in all weather conditions, at ranges sufficient to achieve the desired support of his maneuver scheme and his need to generate combat power to the depth of the battlefield.

JSTARS PROGRAM

Senator **Kennedy**. Dr. Sculley, what is the extent of the difficulty that the Army and the Air Force are having in agreeing on certain aspects of JSTARS program—as for as types of platforms to carry the airborne radar and the need for airborne data processing are concerned?

Dr. **Sculley**. There is no Army and Air Force disagreement with respect to the aerial platform or the data processing; rather, there is disagreement between the Air Force and OSD on the degree of radar commonality possible with the C-18 as the Air Force platform of choice for this program. The C-18 (a militarized Boeing 707) and the OV-1 [Mohawk] are dissimilar aircraft and fly different ractical profiles. To design a single identicar radar that can meet the technical and tactical characteristics of both airframes is not possible in the near term. The radar will be designed for the TR-1/OV-1 airframes. The question of airborne data processing is a reflection of the extra space available in the C-18 which permits more data processing to be accomplished on board the aircraft.

JOINT TACTICAL MISSILE SYSTEM

Senator **Kennedy**. Dr. Sculley, are the Army and the Air Force also having problems deciding on a joint missile for the JTACMS program?

Dr. **Sculley**. No, the Services are not having problems deciding on a joint missile. However, some trade-offs in our range and payload requirements will be needed if the Services are required to develop a common missile. A common missile which minimizes the Services' degradation in its requirements can be developed but trade-offs will still be needed.

AH-64

Senator **Kennedy**. Why is the learning curve currently projected for the AH-64 steeper than that used to develop the initial cost estimate for the AH-64.

General **Drenz**. The recurring labor learning curve, contained in the 1976 APACHE development estimate was 89.9 percent. The corresponding learning curve in the current estimates is 87.5 percent, a net 2.4 percent more optimistic curve. The learning curve of the development estimate was developed to a different production maximum rate than the current estimate (33-83-96-96 vs. 11-48-112-144). The slight improvement in the curve results from higher rates reducing unit costs through improved production efficiencies (material price/quantity breaks, fewer setups per unit, etc.) and through amortization of fixed overhead costs over a larger annual procurement quantity. Since these savings occur in the outyears, they steepen the cost curve slope.

BLACK HAWK

Senator **Kennedy**. Dr. Sculley, will the change in the Navy's procurement rate of their LAMPS [Light Airborne Multi-Purpose System] Helicopter increase the costs of the Army's Blackhawk helicopter over that reported in the December 1982 SAR (Selected Acquisition Report)?

Dr. **Sculley**. The reduction in the Navy's SH-60B Seahawk procurement rate will result in a nominal increase in the unit cost of the UH-60A Black Hawk airframe. This is due to the impact of the production rate adjustment factors in the contract business base clause because of the Navy's decreased procurement rate of the Seahawk. If nominal cost increases are experienced as projected, there could be a minimal increase in the Program Acquisition Unit Cost as shown in the 31 December 1982 UH-60A Black Hawk Comprehensive Annual SAR.

PATRIOT

Senator **Kennedy**. Dr. Sculley, Congress elected not to appropriate funds for procurement of Pershing II Missiles for fiscal year 1983. Yet, funds are being provided to the Pershing II at the expense of other Army missile programs. Will the effect on the Patriot program be a reduction of 3 fire units and 71 missiles in fiscal year 1983 as well as an increase of $20M in the fiscal year 1984 program? What has led you to take such action?

Dr. **Sculley**. The Department of Defense is submitting a supplemental budget request for funds to continue procurement of Pershing II missiles in fiscal year 1983.

The Army is waiting for Congressional action on this fiscal year 1983 supplemental request before taking actions on the Pershing II program which will impact Patriot and other Army programs.

Senator Kennedy. Dr. Sculley, the December 1982 Selected Acquisition Report shows deliveries to be behind schedule for missiles (−52), higher control sections (−3), and launchers (−9). When do you expect to be back on schedule with hardware under contract?

Dr. Sculley. Patriot hardware deliveries are behind contract schedule because of manufacturing problems encountered during the initial production period. Several management actions have been initiated to correct the manufacturing problems. These actions have had a positive impact on production and provide confidence that we can recover to the contract delivery schedule by January 1984 for Ground Support Equipment and June 1984 for missiles.

Senator Kennedy. Dr. Sculley, the December 1982 Selected Acquisition Report reports program cost growth in the Patriot of nearly $500 million due to changes in inflation. Of that about 300 million results from schedule slippages. Why is there a $200 million increase in the program for escalation for other reasons when most other Army programs are showing a decrease in cost due to changed inflation rates? How much of this 200 million is reflected in the fiscal year 1984 request for Patriot?

Dr. Sculley. The table below gives a breakdown of the cost of escalation caused by changes in the December 1982 Selected Acquisition Report. The escalation associated with the schedule slippage is $301.6 million. The major part of the other escalation, or $167.5 million, is associated with the inclusion, for the first time, of the construction costs. Other estimating changes added $5.8 million. A reduction in the initial spares requirement resulted in a decrease of $52.0 million. Application of the January 1983 indices gave a reduction of $197.3 million; however, application of the historical deflators provided at the start of fiscal year 1983 produced an escalation increase of $253.4 million for a net economic increase of $56.1 million. This $253.4 million escalation increase in offset by a $253.4 million decrease in estimating, i.e., net program increase for deflators is zero. The sum of all these changes is $479.0 million as reported in the December 1982 Selected Acquisition Report.

Action:	*Change (Millions)*
Schedule delay	+$301.6
Estimating	+173.3
Construction	+167.5
Other estimating	+5.8
Spares reduction	−52.0
Economic	56.1
Jan 83 indices	−197.3
Historical deflators	+253.4
Total	+479.0

There is no increase in the fiscal year 1984 budget request as a result of this increase. Actually application of the January 1983 inflation indices resulted in a decrease in the fiscal year 1984 request of $28.9 million.

BRADLEY FIGHTING VEHICLE

Senator Kennedy. Dr. Sculley, the Bradley Fighting Vehicle tends to appear fairly frequently in articles published on ways to reduce the defense budget. What are the primary reasons for all this attention and what are the Army's counter arguments?

Dr. Sculley. I believe the primary reasons for the Bradley's attention in the media is that the vehicle will be fielded this year to our soldiers in both the U.S. and Germany. After reading these articles, it is apparent that the authors have distorted the facts and neglect to recognize the capabilities and employment of the Bradley. The Army has responded to these arguments by producing a vehicle which meets its requirements within the budget constraints established by the Congress.

Senator Kennedy. Dr. Sculley, what is the relative cost of the Bradley and the M113 armored personnel carrier it is replacing?

Dr. Sculley. It is virtually impossible to compare the relative costs of the Bradley and the M113 because of two primary reasons—the Bradley is a fighting vehicle while the M113 is simply a carrier of troops; the M113 has been in production for over 20 years while the first Bradley was delivered in May 1981. The roll-away unit cost of the Bradley is $1.13 million. The roll-away unit cost of the M113 is $180 thousand.

Senator KENNEDY. Dr. Sculley, last year the Army decided not to bring on a second source of production to introduce competition into procurement of the Bradley, preferring to, instead, procure the Bradley under a multiyear contract starting in fiscal year 1984. Yet, you have not requested multiyear procurement for the Bradley for fiscal year 1984. Why is there no such request?

Dr. SCULLEY. In October 1982, the Army decided against establishing a second source for vehicle production. Vehicle production represents approximately 40 percent of the unit cost. Competition and multiyear procurement of the remaining 60 percent, which is provided as government-furnished equipment to the prime vehicle contractor, is the backbone of our acquisition strategy. The Army did not request multiyear procurement for vehicle production in fiscal year 1984 because the estimated savings were not sufficiently attractive.

Senator KENNEDY. Dr. Sculley, we have had testimony from Secretary of the Navy Lehman that strongly advocates competition from second sourcing to control costs. Why does the Army not subscribe to this point of view where the Bradley is concerned? Does the Army have current analysis that shows competitive procurement to be undesirable? In what programs is the Army pursuing second sourcing?

Dr. SCULLEY. The Army advocates second sourcing and competition on the Bradley and other programs. For the Bradley the primary emphasis has been on subsystem, component and vendor part second sourcing and competition. The Army does not have analysis that shows competitive procurement to be undesirable. In addition to the Bradley items, we are pursuing second sourcing on other systems such as the Hellfire missile, Tow missile and the M1 Tank engine. The Army has accepted second source contracts for the M60A3 Tank laser rangefinder and ballistic computer.

M1 TANK PROGRAM

Senator KENNEDY. Dr. Sculley, last year the Congress increased the Army's request for procurement of the M1 tank and provided funds for advance procurement of more tanks than the 720 you requested for fiscal year 1984. Why, then, is the Army requesting only 720 tanks for fiscal year 1984?

ANSWER. The reduction to 720 tanks in fiscal year 1984 was solely due to short-term affordability. The M1 tank tank is still the Army's first priority, but the constrained total obligation authority (TOA) required that production be held to 720 tanks per year. Other program cutbacks also occurred so that a balanced force could be maintained.

FIELD ARTILLERY AMMUNITION SUPPORT VEHICLE (FAASV)

Senator KENNEDY. General Merryman, why should the Army procure a specialized vehicle—the FAASV—to provide armor protection for artillery ammuniton on the battlefield when other explosives and flammables will be transported in unprotected trucks?

ANSWER. Counterbattery fire against our 155mm and 8" cannon units is a very high priority mission for enemy artillery. Each FAASV will continuously be deployed with or near the howitzer it supports and will provide armored protection for ammunition and for crew members who are not now protected. Ammuniton is now carried unprotected in M548 carriers which presents a real danger of catastrophic detonation from enemy fire, and correspondingly, to the survivability and effectiveness of the crew and howitzer. Without FAASV, about half the crew, those who handle ammunition, have no armored protection from enemy fire. Other vehicles carrying explosives and flammables are not continually deployed in the firing areas of the howitzers or used for protection of personnel in the firing areas.

BRADLEY FIGHTING VEHICLE

Senator KENNEDY. Why did the Army not request a multiyear contract for the Bradley Fighting Vehicle starting in fiscal year 1984? Does the Army plan on using dual-sourcing to stimulate competition and reduce costs.

ANSWER. The Army did not request a multiyear contract for Bradley vehicle assembly and production in fiscal year 1984 because the estimated savings over annual fiscal years 1984 through 1986 contracts were not sufficiently attractive. The Army has established dual sources for the Bradley track, driver's viewer, smoke grenade launcher, 25 millimeter ammunition, 25 millimeter fuze and 30 to 40 percent of the vendor supplied parts/materials. On a dollar value basis, the vendor items with second source amount to 80 to 90 percent of the cost of these items.

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN, ANSWERS SUPPLIED BY DR. J. R. SCULLEY, ASSISTANT SECRETARY OF THE ARMY (RD&A); AND LT. GEN. J. H. MERRYMAN, U.S. ARMY, DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT, AND ACQUISITION

PROGRAM STABILITY

Senator LEVIN. General Merryman's statement places heavy emphasis on program stability as a way to improve program management and contain costs. However, the following examples of program instability continue to beset the Army program in fiscal year 1984:

M-1 procurement for fiscal year 1984 is 720, a cut of 360 below fiscal year 1983 projection for fiscal year 1984;

Army tactical missile procurement for fiscal year 1984 is 2,791 below last year's projection for fiscal year 1984;

Army proposed last year buying zero M113A2 Armored Personnel Carriers, zero M557A2 Armored Command Post Vehicles, and zero M109 Self-Propelled Howitzers in fiscal year 1984. Now, however, the Army proposes to buy the following in fiscal year 1984:

652 Command Post Vehicles for $130M
400 Armored Personnel Carriers for $73.2M
112 Self-Propelled Howitzers for $82.1M

Army projected last year buying 9504 more high mobility multipurpose wheeled vehicles and commercial/utility cargo vehicles than are now in the fiscal year 1984 budget.

How does the Army explain these stark examples of changes in the Army program in only one year? Why aren't these examples of a lack of program stability?

General MERRYMAN. When the fiscal year 1983 budget request was finalized by Army and submitted by the President in February 1982, the quantities of those acquisition programs named in the question that were projected to be requested in the fiscal year 1984 budget were at those levels considered most appropriate based on all factors known at that time. In the formulation of a budget proposal, numerous factors—some of which are at contradiction to each other—must be taken into consideration and resolutions reached in order to develop a balanced total Army program.

With regard to the specific programs discussed, the following is provided:

The proposed buy for M1 tanks as contained in the fiscal year 1984 budget was 360 less than the projected buy for that year as contained in the fiscal year 1983 budget. This reduction was due solely to short term affordability. The M1 is still a high priority major system but we were not able to afford the higher procurement quantity and still maintain a balanced budget.

The decrease in tactical missile procurement from the fiscal year 1984 column of the fiscal year 1983 Budget to the fiscal year 1984 Budget Submission was necessitated by the same basic reason—affordability within total funding levels.

The M113A2, M577A2, and the M109 SP Howitzers are older, non-major systems for which valid requirements still exist. Although their procurement is normally sought each year based on requirements, these systems compete for available funds and, therefore, the proposed procurement quantity will fluctuate as funds change and as requirements change. Total requirements for these systems have increased and the fiscal year 1984 budget request shows the result of that change. Procurement of these systems is carefully balanced to maintain their production base and to optimize readiness while modernizing the force.

The reduction in the planned procurement of High Mobility Multipurpose Wheeled Vehicles and Commercial Utility Cargo Vehicles [HMMWV/CUCV] as reflected in the fiscal year 1984 column of the fiscal year 1983 budget as compared to the fiscal year 1984 budget submission (i.e., a total of 9504 vehicles) was a result of a funding reduction to those systems. This reduction was required to fund other higher priority Army requirements. It should be noted that additional funding for HMMWV/CUCV is planned for the outyears to compensate for the fiscal year 1984 reductions and that the total program quantity buy will change very little. Both systems are now on fixed price multiyear contracts and the revised program is sufficient to support those contracts.

There have been changes in the fiscal year 1984 projected buys the systems discussed herein from our plan as of February 1982 to the actual fiscal year 1984 Budget that was submitted in January 1983. Most of those changes were made on the basis of overall affordability or on changes in requirements. These changes are considered necessary to achieve a balanced Army program.

COST ANALYSIS

Senator LEVIN. General Merryman, in your statement you said that the Army Comptroller has begun a 5 year program to update cost analysis techniques and the data base on which they rely. How much will that effort cost, and why must it take so long?

General MERRYMAN. The Army Comptroller program for improving cost analysis through contractual support is not limited to five years. This improvement program began in fiscal year 1982, and contractor supported cost research has been requested in the fiscal year 1985–1989 program for $5 million per year. This level of funding will support 9 to 12 projects per year depending upon the research topic and required depth of analyses. On the average, 12 months are required to complete a cost research project. Some projects that produce automated models for common use by various Army major commands will require up to 3 years to complete. Cost methodology and cost estimating data bases supporting the research & development, investment and operating & support phases of a system's life cycle must be created/updated for the Army's major equpment cataegories: aircraft, missiles/rockets, electronics, communications, tracked combat vehicles, wheeled combat vehicles, and munitions. The time required to complete the necessary research and data base developments cannot realistically be compressed at the planned funding level. Thorough research and innovation by the contractor, coupled with guidance, critical reviews and analyses by the Army, necessitate a reasonable length of time for successful project completion.

COMPETITION IN SUBCONTRACTING

Senator LEVIN. How is the Army moving to increase this subcontractor competition-mandating that certain percentages of the subcontracts be competed; changing specifications or procedures to permit more subcontractors to bid; establishing follow-up procedures with the prime contractors to ensure the prime contractor is making a vigorous effort to increase subcontractor competition; etc.?

Dr. SCULLEY. The Army has conducted a study in order to gain more knowledge on competition is subcontracting and to further explore the potential for increased competition. The study included selected major systems and large dollar value programs. It was found that the potential for subcontract competition can vary greatly from system to system and contract to contract and is a function of numerous opportunities and constraints. Because of this the mandating of certain percentages or the establishment of goals for subcontract competition is not considered appropriate. Whether or not changing specifications would enhance subcontractor competition has not been the subject of a specific Army study. Specifications are written primarily to define performance or essential Army technical requirements for items, material and services rather than to direct procurement toward a particular method of contracting.

The area of possibly providing additional incentives to increase subcontract competition, particularly at the component level, is curently being examined. Such an incentive to prime contractors to compete components to subcontractors could provide for the sharing of any resulting dollar savings.

The potential for increased competition in subcontracting has been recognized for some time, but there has been little data available for evaluation. In this connection, the Competition Sub Group of the Defense Acquisition Improvement Group, comprised of representatives from Army, Navy, Air Force and Defense Logistics Agency, has recently agreed that it would be beneficial to send a letter to various industry associations requesting their comments concerning a proposal that industry report on a range of subjects relating to subcontract competition on DOD contracts. The proposed letter is being prepared and will be submitted to the Competition Sub Group for review.

UNIT COSTS

Senator LEVIN. You have stated that the Army is emphasizing reduction in the unit costs of its weapons systems. For all of the Army's major weapons systems, especially those now being introduced into service in fiscal year 1982–fiscal year 1984, how has the program unit cost of each weapons system changed since its fiscal year 1984 unit cost was projected in fiscal year 1983? Please provide this in both current and constant dollars (fiscal year 1984) and provide the major reasons for each change, especially those which have occurred since last year. In each case, what is the Army doing to prevent further program unit cost increases in the future?

Dr. SCULLEY. Listed below for comparison purposes is cost data on 13 Army SAR programs that were SARs as of both December 1981 and December 1982. Comparison is made of the program acquisition unit cost (PAUC) in both current dollars and fiscal year 1984 constant dollars. All but 4 of the programs (Apache, Blackhawk, DIVAD, and Hellfire) had or will have an Initial Operational Capability [IOC] during fiscal year 1982–84.

SAR program	December 1981 SAR PAUC (in millions of dollars)		December 1982 SAR PAUC (in millions of dollars)		Change in PAUC December 1981–December 1982	
	Current dollars	Constant [1] dollars	Current dollars	Constant [1] dollars	Current dollars	Constant [1] dollars
AN/TTC-39	5.198	5.682	5.475	5.695	+0.277	+0.013
Apache	16.222	14.630	14.064	12.630	−2.158	−2.000
BFVS	1.942	1.652	1.541	1.370	−0.401	−0.282
Black Hawk	7.013	6.789	6.611	6.707	−0.402	−0.082
CH-47 Mod	7.186	6.186	7.477	6.405	+0.291	+0.219
Copperhead	0.030	0.033	0.066	0.086	+0.036	+0.053
DIVAD	6.646	6.301	6.631	6.095	−0.015	−0.206
Hellfire	0.057	0.054	0.052	0.049	−0.005	−0.005
M1	2.768	2.583	2.882	2.626	+0.114	+0.043
MLRS	12.090	10.723	12.230	11.090	+0.140	+0.367
Patriot	99.159	102.413	108.155	111.733	+8.996	+9.347
Pershing II	168.700	159.600	164.200	160.300	−4.500	+0.700
Stinger	0.082	0.072	0.082	0.075		+0.003

[1] Fiscal year 1984 constant dollars.

The major reason(s) for change in the PAUC for each program:

a. Programs showing decrease in current dollars:

Apache: Lower inflation index, more efficient production profile, increase in quantity (+69).

BFVS: Lower inflation index, elimination of 25mm ammunition procurement costs from program acquisition costs, deletion of programmed procurement product improvements, changes in acquisition strategy for components.

Black Hawk: Lower inflation index, change in procurement strategy to airframe multi-year procurement (fiscal year 1985–1987).

DIVAD: Lower inflation index, decrement in fiscal year 1983 budget request by appropriations committee.

Hellfire: Lower inflation index, increase in quantity (+6,596).

Pershing II: Cost of spare parts carried over from 1981–1982, procurement funds replaced by OMA funds.

b. Programs showing increase in current dollars:

AN/TTC-39: Program restructure, increase in quantity (+18). Corrected figures for Dec 81 SAR are 5.713 for current dollars, 6.134 for fiscal year 1984 constant dollars because of error in initial spares cost which yields a cost decrease.

CH-47 MOD: Escalation of labor rates and costs of materials, decrease in Government Furnished Equipment [GFE] availability.

Copperhead: Program reductions changed the approved total program quantity from 44,986 to 10,230 projectiles and total program funding from $1.3B to $0.7B.

M1: Program stretchout due to reduction in annual procurement quantities from 1,080 to 720 per year during FY84–90.

MLRS: Realignment of funding for advance materials (economic order quantities) for options to multiyear contract, military construction costs.

Patriot: Military construction costs, program stretchout due to outyear constraints.

c. Program showing negligible change: Stinger.

In efforts to prevent further program unit cost increases, the Army is doing the following in regard to the respective programs that show increases in current dollars:

CH-47 MOD: Purchase material and components in economic order quantities, negotiate, for multi-year procurement.

Copperhead: The Army and OSD are currently reviewing this program to determine its feasibility for continuation.

[illegible]: Review the production profile for the program during the process of building the fiscal year 1985-89 POM with the possibility of increasing annual rate of production.

MLRS: Five-year (fiscal year 1983-87) multi-year procurement contract (Firm Fixed Price) expected to be awarded.

Patriot: Negotiated goal achievement program in the fiscal year 1982 contract, breakout of hardware procurement, examine multi-year procurement contracting starting in fiscal year 1985.

DIVAD

Senator Levin. GAO reports that the DIVAD Gun prototype delivered to the Army for testing last May had so many deficiencies that the tests had to be cancelled. There were problems with the radar fire control system, the graphic display unit and armament feed system. What has the contractor/Army done since then with DIVAD to correct these problems?

Answer. The problems noted occurred during a demonstration in July, 1982. In regard to the radar, a latent manufacturing defect surfaced in a computer memory chip after several years of use in the radar control computer. Modern production techniques, 100 percent component screening and production quality control will eliminate this type of failure. There have been no other occurrances of this type of failure in the radar system.

The prototype graphic display unit blanked out on several occasions. Due to earlier identification of this type of problem, a different manufacturer has been selected to produce the graphic display units for production of DIVAD systems. This new graphic display unit for production fire units has successfully passed shock and vibration qualification testing.

Problems were encountered in the ammunition feed system. Prior to this test the problem had been identified, and the lower magazines of the feed system were undergoing redesign. An extensive contractor and Government test program will examine this redesigned lower feed system prior to Government acceptance of the first production fire unit.

Senator Levin. After DIVAD's scheduled testing last May for reliability, availability, maintainability and durability [RAM-D] was cancelled because the prototype supplied was deficient in too many areas, did the Army's Test and Evaluation Command and its Material Systems Analysis Activity both recommend that the May, 1983 production option of 96 DIVAD guns not be exercised until after the system successfully completes Government RAM-D testing?

Answer. No. These agencies expressed a desire for additional reliability, availability, maintainability, and durability testing. It should be noted that the reliability, availability, maintainability, and durability test was not canceled, but was changed from a formal scored test to a contractor engineering test in which the reliability, availability, maintainability, and durability test plan was followed. Both agencies have always expressed their concern over the limited amount of testing on this program. It has been one of the tradeoffs in this accelerated program.

Senator Levin. The Army has no plans to have its independent test and evaluation agencies perform reliability and maintainability testing until after initial production units are available in March, 1984. Why shouldn't the Army follow its testers recommendations and not exercise the May 1983 option?

Answer. The testers have not recommended that the second production option not be exercised but they have stated their concerns over some of the risks in this program. Although formal testing of production units does not take place until 1984 we do gain some meaningful data prior to that time. We will test a production feed system this summer at Fort Bliss under the supervision of our test agencies. Additionally, we have intensified our subsystem qualification tests. Most importantly, we have a contract with Ford Aerospace which requires that the DIVAD system meet our reliability requirements or that the contractor correct the deficiencies at his expense. These measures give us confidence that it is prudent to execute the contract option as presently scheduled.

Senator Levin. Why should Congress approve any additional DIVAD production money in the fiscal year 1984 budget until after these tests?

Answer. In general, good reliability for the system was shown in early testing of the prototypes. After the prototypes had been extensively used, reliability problems began to increase in some subsystems. The government has carefully evaluated this later experience, and determined that it was caused largely by overuse of the prototypes, the lack of spare parts, certain environmental factors, and the expediency employed in building the prototypes and conducting the test.

The DIVAD fixed-price incentive contract significantly reduces Government risk. The contractor has guaranteed that specified reliability levels will be met at the Initial Production Test or he must retrofit (at his own expense) all units produced to achieve that reliability. Thus, it is advantageous for the Government to sign the 1984 option to derive the full benefits of this contract. Contract renegotiation in a sole-source environment could result in a significant cost increase.

Senator LEVIN. After the Government's independent RAM-D test was canceled the DIVAD program manager and the contractor began a scaled-down version of the tests. Isn't this a departure from the Army's normal weapons acquisition procedure, which is to have a new system evaluated by independent Army agencies? Aren't these agencies expected to be more objective than a system's program manager or the contractor involved?

ANSWER. The DIVAD system has been evaluated by the independent Army test agencies at the Developmental/Operational Test in 1980, at the Check Test in 1981/1982 and will be tested again during June and July 1983. The type of test conducted by the Government at Aberdeen Proving Ground is known as a customer test wherein the project manager was the customer. It is not an unusual procedure.

Furthermore, the independent agencies were able to observe and collect data on the subtests in which they had an interest. The Army's independent test agencies are chartered to be objective in their evaluation of a system.

PATRIOT

Senator LEVIN. Is it not true that the test begun after the independent RAM-D test as canceled is not as comprehensive as the one planned by the independent Army test agencies? Is it not true that DIVAD will accumulate less milage and fire fewer rounds, and that its fire control system will be operated fewer hours? Doesn't this mean that the scaled down test really is not an acceptable substitute upon which to base a decision whether to exercise the May 1983 production option? How can Congress be confident that DIVAD will meet all its RAM-D requirements without a more comprehensive, independent test?

ANSWER. The test conducted at Aberdeen Proving Grounds was as comprehensive but not as extensive as the one originally planned.

Significant accomplishments while in test included: automotive mobility demonstrations of acceleration, steering, braking, sustained speeds, trench crossing, side slope and gradability; durability road testing which included the Munson and Perryman Courses; system startup, operation and firing at −25°F, evalution of engine/transmission cooling under full load conditions, and demonstration of design modification incorporated to reduce full load temperatures to M-48 levels; demonstration of Identification, Friend or Foe Mode 4 operation; detection and tracking of aerial targets in treeline conditions; demonstration of smoke grenade and secondary armament operations; accumulation of moving vehicle and firing shock and vibration data Built-In-Test Demonstration Number 1, with insertion of 57 simulated faults into the system; and numerous human factors engineering evaluations of crew/system interactions during operation and maintenance.

Quantitative accomplishments for the prototype fire unit while at Aberdeen Proving Ground included:

1,105 miles of vehicle travel (vs. 2000+ originally planned).

617 hours of system operation (vs. 900+ originally planned).

3,643 rounds of 40mm ammunition fired (vs. 6,000 originally planned).

This test permitted the contractor to adequately explore failure modes when they occurred so they could be properly documented in sufficient time to insure that design corrections were incorporated into the production fire units. This process was more valuable to assuring that the production DIVAD fire units are highly reliable than a scored government test in which the contractor could not follow-up on failures to explore their parameters.

The Army examined a spectrum of strategies to ensure that the DIVAD will meet all its reliability, availability, maintainability, and durability requirements. The alternative chosen, which was deemed to be the most cost effective, was to do the following additional testing of production hardware:

a. More intensive monitoring of planned contractor functional and qualification testing of components and subsystems from July 1982 through September 1983. The performance of these subsystems and line replaceable units will be tested in extensive qualification tests before fire unit delivery that will be tested in extensive qualification tests before five unit delivery that will be monitored by the independent Defense Contract Administration Service [DCAS] and other Government agencies.

b. More government visibility into Contractor Maturity Test II through monitoring and data analysis. Contractor Maturity Test II will use the first two production fire units and run from September 1983 to March 1984.

c. An additional production fire unit will be made available for Contractor Maturity Test II (fire unit #7).

d. Two additional production fire unit (#21 and #22) will be added to the Aberdeen Proving Ground phase of the Initial Production Test scheduled from April through October 1984.

Additionally, the contractor is highly motivated to meet the reliability level specified for the Initial Production Test since he is contractually bound to retrofit all units until they achieve that specified capability. The risk to the Government is minimized by these contractual provisions.

DIVAD

Senator LEVIN. GAO has reported that the Army's Logistics Evaluation Agency as well as the office of the Deputy Chief of Staff for Logistics have expressed concerns that DIVAD's maintenance system may be inadequate to properly support the system for several years after it is fielded. What is the Army doing to minimize this problem?

ANSWER. The Integrated Logistic Support [ILS] program for the Sergeant York Air Defense Gun System has been considered a high risk since its inception. In serveral logistic disciplines there is concurrent development which has provided reason for concern in the Army logistic community. A number of actions have taken place to minimize the impact of the inherent risk. The Logistics Support Analysis [LSA] is being intensely managed by the government and contractor. It provides for accelerated release of engineer drawings to the contractor logistics division. Also, the contractor has established an internal computer system which expedites accessibility to resource data by logisticians for development of technical manuals, training materials and devices, peculiar support equipment, and intial spares provisioning packages. The direct support and general support resident courses have been realigned to coincide with Automatic Test Equipment and Test Program Set development. Preliminary technical manuals delivery has been phased to provide the most current data to support Instructor and Key Personnel training. Physical Teardown and Logistic Demonstration has been extended to provide for a comprehensive technical manual verification effort. Additional Built-In-Test [BIT] demonstrations are scheduled to accurately display its progressive maturity. A comprehensive test plan on automatic test equipment will be executed prior to fielding. The mantenance concept is established in concert with current Army guidance and directives. The initial provisioning effort is supported by a combined government team on-site at the contractor's plant. The Program manager is continously conducting joint reviews with the Commanders of the Army's Armaments Command, Air Defense School, Missile and Munitions Center and School to insure they are current in the program logistics posture.

Senator LEVIN. Canceling the Government RAM-D tests demonstrated that the DIVAD prototype still had serious deficiencies. How different is this prototype from those models now being produced? Is it also possible that further deficiencies will be detected during Government RAM-D testing which would require redesign of DIVAD production models? Doesn't all this argue for waiting until the first production models have been sufficiently, independently tested before exercising any options to produce more DIVADS?

ANSWER. The prototype fire unit tested is significantly different from the production models due to producibility and redesign changes made to incorporate fixes to problems discovered in previous testing. The production model line replaceable units where the majority of the changes have occurred, will undergo extensive qualification testing before the first fire unit is delivered to the Government. This testing will verify that these subsystems can function and survive in all expected adverse environments and add significantly to the confidence that entire production fire unit will be similarly successful.

It is reasonable to expect that a severe reliability, availability, maintainability, and durability test could uncover additional deficiencies. Due to the qualification testing and extensive contractor maturity testing to be conducted before the Initial Production Test, significant deficiencies are not expected to be found. The DIVAD contract with Ford Aerospace requires that the contractor deliver systems which meet reliability goals or correct the deficiencies at his expense. We feel these actions will allow the government to exercise, with a high degree of confidence, the next production option as presently scheduled.

Senator LEVIN. The Congressional Budget Office [CBO] contends that the Sergeant York Division Air Defense Gun [DIVAD] has too short a range to be able to attack the newest Soviet antitank/ground helicopter—the HIND E—before that helicopter could attack it or other targets with its [deleted] range. By the end of the decade almost 50 percent of the [deleted] range missiles thus significantly undercutting DIVAD's utility according to CBO. Does the Army admit to this deficiency in DIVAD?

ANSWER. The Army believes DIVAD has sufficient range to provide air defense coverage through the coming decade. The HIND-E Helicopter and the Follow-on Attack Helicopter (FAH) are usually attributed with Anti-Tank-Guided Missiles (ATGMs) with [deleted]. However, all studies and tests indicate that the achieved stand-off range under operational conditions will be much less than the theoretical range capability of a missile guidance link. The latest threat estimate for the Sergeant York program, which has received validation by the Defense Intelligence Agency (DIA), estimates the achieved operational stand-off ranges in the [deleted]. In most cases this is within the effective range capability of the Sergeant York system. Although there may be a few situations when aircraft will be able to achieve máximum stand-off, the following factors will tend to limit operational stand-off, the following factors will tend to limit operational stand-off capability: The degree of prior knowledge of target location, camouflage of the ground target, defensive versus offensive scenarios, efficiency of communication between attack aircraft, and the general confusion of a mulitple gun/multiple aircraft battlefield.

Senator LEVIN. CBO also contends DIVAD's radar could become vulnerable to Soviet missiles designed to home in/and destroy radar systems. Does the Army agree and if so, how is it trying to minimize or defeat this threat?

ANSWER. Although all systems which employ emitting radar are somewhat vulnerable to anti-radiation missiles (ARM), the Sergeant York system has been designed to survive such attacks. The original requirement documents stated that at least [deleted] probability of surviving a single anti-radiation missile engagement was required.

The Sergeant York is designed to survive anti-radiation missile's via armor protection on the entire vehicle, [deleted]. If a missile target is declared, an immediate sequential process would occur: [deleted].

This sequence of events has been tested, with some corrections being required for the proper classification of missile targets (and prevention of false alarms), and the exact timing of the shutdown sequence. Additional testing of the refined software will occur in mid fiscal year 1983. Even in earlier testing, the Army's independent evaluation agency (Army Materiel Systems Analysis Activity) determined that the York system had greater than a [deleted] percent single anti-radiation missile engagement survivability.

Senator LEVIN. At what point in the DIVAD R&D or procurement did the Army become aware of the [deleted] effective range of the HIND-E? If it was early enough to modify DIVAD, why wasn't that done? If it was too late in the program, what led to our intelligence failures?

General Merryman said Army studies show DIVAD will be effective against the HIND at normal operational ranges. Why do you expect the Soviets will not try to use the HIND at the farthest edges of its missile range—whether it is much or little more than DIVAD range, it still is more?

ANSWER. When the Sergeant York DIVAD Gun program was initiated, the maximum effective range estimate for [deleted]. By 1982, estimates [deleted] were appearing in the intelligence literature. These were often associated with the attack helicopter operating [deleted]. This was too late to change the design of DIVAD. The Army believes that the vast majority of engagements would occur with aircraft at intermediate ranges. Aircraft will attempt to stay as far away from enemy air defense as possible, but will be limited by the degree of prior knowledge of a target's location, camouflage of the ground target, defensive versus offensive scenarios, the non-availability of convenient masking locations for long range attack, efficiency of communication between long range aircraft and closer-in acquisition/designation aircraft and ground stations, the dynamics of a multiple gun/multiple aircraft battlefield and other factors.

These limitations make it very difficult for the Soviets to accurately stay at the far edge of their range capability. Additionally, DIVAD is not alone in our air defense inventory and even if any one particular HIND could stand outside any one particular DIVAD it is quite possible that either another DIVAD or some other system such as Stinger could provide effective fire.

Senator **Levin**. Army believes that DIVAD contract provides full protection against schedule slippages, cost overruns, and performance deficiencies. (a) Please identify those contract provisions, and (b) state how they differ from provisions in contracts for other major weapons systems.

Answer. The contract clauses on system responsibilities, configuration management responsibility, and correction of deficiencies make the contractor responsible for design and performance of the system. Protection against cost overruns are provided by the fact that this is a fixed price incentive fee contract; that is, the Government will share in costs up to the target ceiling in the contract—any costs beyond that figure are totally at the expense of the contractor. The incentive ratios and ceilings were developed based on the Government's assessment of the risk involved during the base contract or any one of the three option periods. Protection against schedule slippages is provided in that any delays would result in increased costs which would be at the contractor's expense once the target ceiling of the contract was exceeded.

AH-64

Senator **Levin**. What factors (such as toolings, castings/forgings, materials) are critical to maintaining the current production schedule? GAO contends that hurdles critical to smooth operations of the AH-64 production facility—tooling, inspection procedures and equipment, "debugging" the production line—must yet to be overcome. Has the Army's original schedule to overcome these hurdles changed; where are the Army and the contractor relative to the original schedule and any changed schedule?

General **Merryman**. All critical tooling is complete and first articles have been machined and are being inspected. Critical castings/forgings have been delivered and are in first article inspection. Critical materials such as ESR 4340 steel have been delivered and accepted for Lot 1 and Lot 2. The present production schedule is planned to provide 515 aircraft at a 12 per month peak rate, and has a schedule which includes a two month buffer for unknown problems. All milestones are planned conservatively to further protect contract deliveries.

AH-64 PRODUCTION RISK MONEY

Senator **Levin**. The Army no longer believes that the $528 million in production risk money included in the AH-64 program budget is necessary. Has an independent production risk assessment been conducted for the AH-64 since the original production readiness review, and how has that independent assessment provided evidence that risk has lessened sufficiently to permit using the $528 million for other purposes? Does the office of the Secretary of Defense agree this risk money no longer is necessary?

General **Merryman**. Last year's total program inlcuded a management reserve fund of $528 million. Those funds were added to budget for what was then felt to be the most likely cost of the program. Intense Congressional pressure on both the Army and Hughes Helicopters resulted in a very successful fiscal year 1982 contract negotiation. After examining the recurring labor costs from those negotiations and conducting an extensive cost review to refine the most likely cost, it is now considered prudent to apply the reserve funds toward procuring additional aircraft. The additional procurement of these badly needed aircraft more closely aligns the buy with the need. The program has been restructured to achieve a 12/month production rate 10 months earlier, thus resulting in greater efficiency and lower unit costs.

The Army Corps of Engineers evaluated the Mesa construction effort and expressed high probability of schedule completion on time. HHI completed construction 2 months early. Defense Logistics Agency [DLA], Army Plant Activity at HII, DOD-PESO, and the Advanced Attack Helicopter Program Manager's Office (AAH-PMO) monitor all areas on a monthy basis and have high confidence that the schedule will be met.

The decision to utilize the risk money to procure additional helicopters was approved by all ASARC principals including the Army Comptroller. The Deputy Secretary of Defense approved the use of those funds and increase of the aircraft buy to 515 in Program Budget Decision [PBD] 100 dated 2 December 1982.

AH-64 PRODUCTION

Senator **Levin**. Has an independent assessment been done of the contractor's capabilities to support the higher ramp-up in production the Army is proposing for fiscal year 1984? If so, provide its results; if not, how can the Army justify this increase?

General **Merryman**. The presently planned economic rate of production is 12 aircraft per month. An extensive producibility engineering planning effort gives added confidence that the schedules can be met. The feasibility of such a ramp was based on other production history such as on Black Hawk and AH-1G/S. An independent assessment was not considered necessary. At the end of the on-going fiscal year 1983 buy, the production ramp will have built to a 7 per month rate. The fiscal year 1984 buy continues that gradual build-up and achieves an 11 per month rate 12 month later. The following table shows this gradual build-up.

Aircraft delivery

Calender year 1984 (fiscal year 1982):	
January	0
February	1
March	1
April	1
May	1
June	1
July	2
August	2
September	2
Calender year 1985 (fiscal year 1983):	
October	3
November	3
December	3
January	4
February	5
March	5
April	6
May	6
June	6
July	7
Calender year 1986 (fiscal year 1984):	
August	8
September	8
October	8
November	8
December	9
January	9
February	10
March	10
April	10
May	10
June	11
July	11

AH-64 CORRECTIONS

Senator **Levin**. What deficiencies were detected in the November 1982 flight tests of the AH-64's modified target acquisition and designation sight and what is the Army doing to correct these faults?

General **Merryman**. TADS successfully completed this flight test on 17 November 1982. Compliance with the Army's Material Need and Decision Coordinating Paper requirements for the TADS/AAH was demonstrated. Major test objectives and significant results were:

(a) Autoboresight—Autoboresight was successfully demonstrated both on the ground prior to mission start and during flight. Accuracy to meet probability of hit (P_H) requirements was demonstrated.

(b) Boresight Retention—After autoboresight, retention of boresight accuracy over a typical mission was also successfully demonstrated to meet P_H requirements.

(c) Manual Tracking—Improved gains in the manual tracking controls were incorporated and satisfactory manual tracking performance was demonstrated against moving targets. Manual track is the backup to the primary image auto track [IAT] mode.

(d) Gunfire IAT performance—Previously identified problems with IAT breaklock were corrected by installing a higher range yaw axis angular accelerometer. 30MM gun firing in flight without breaklock was demonstrated.

AH-64 FAULT DETECTION

Senator **Levin**. GAO contends that the AH-64's fault detection system and ground test station-of problems, both key to rapid identification and repair of the Helicopter to permit high operational availability, have not been sufficiently tested.

Has the fault detection system been thoroughly tested with all sections of the aircraft?

Has the ground test station been tested under combat conditions by the Army's independent operational testing agency? If so, what deficiencies have been detected and what is being done to correct them?

If not, when will this be done and will the test results be evaluated before the AH-64 is fielded?

General **Merryman**. The AN/MSM 105(V)2 test repair station will be operationally evaluated in a tactical environment utilizing mission profiles that simulate realistic combat conditions. It will be operated and maintained by Army personnel. This test is scheduled to begin in April 1984 and will last for 4 weeks.

The U.S. Army Transportation Center has been designated as the lead proponent and the U.S. Army Signal Center is designated as the cooperative proponent for user testing. The independent evaluator is Training and Doctrine Command [TRADOC].

AH-64 ENVIRONMENTAL PROTECTION

Senator **Levin**. GAO contends that environmental testing of the AH-64 and Hellfire identified significant problems. How will the cumulative effect of temperature extremes on aircraft, missile, and test station affect operational availability for antitank missions—in both Europe and the Southwest Asia scenarios?

General **Merryman**. The automatic test station's core computer has not been environmentally tested as an entity. It has been tested as part of a total system, AN/MSM-105(V)1 Test and Repair. An evaluation of the cumulative effects of temperature extremes on aircraft, missile and test station is as follows:

(1) Aircraft—Aircraft systems are considered to have been corrected for those repeatable failures associated with temperature extremes.

(2) Missile—Those missile environmental failures that occurred at extreme temperatures, have been isolated to specific components and design changes have been incorporated, retested and shown to eliminate the problems. All production missiles incorporate these changes.

(3) Automatic Test Station—During environmental temperature/humidity tests those problems that occurred were random and therefore, no specific design changes to circuit boards were warranted. The Test Station was susceptible to high humidities during extended non-operating periods. Therefore storage instructions have been amended to include use of desiccants. Since the Apache version of the Test Station will be undergoing the same level of environmental tests as the AN/MSM-105(V)1, another opportunity exists to confirm procedural change corrections.

Thus, there are no compounding environmental cumulative effects which will degrade operational availability for the antitank mission.

HELLFIRE

Senator **Levin**. GAO contends that the Hellfire missile program total projected procurement—in terms of both missile numbers and costs—is significantly understated. The Army procurement estimate for Hellfire now is 35,756 missiles. Is it not true that Army simulations on missile usage rates have had widely varied results, with some projecting a need for as many as 72,000 tactical missiles?

General **Merryman**. This is true. Study results have varied because of differences in study input variables, such as fluctuating platform quantities and types, as well as the Army's Concepts Analysis Agency [CAA] study not including the latest tactical concepts.

Senator **Levin**. Is it not true that the 35,756 total does not include some 10,000 Hellfire's needed for training and production lab testing? Why are these missiles not included in the Hellfire program numbers being advertised to Congress? Does the Army intend to buy these additional missiles at some point in the Hellfire program? What is the additional cost associated with purchase of these 10,000 missiles and shouldn't it be included in the total program cost reported to Congress?

General MERRYMAN. This quantity has not been excluded from the current estimate. The Army does not feel a valid requirement for Hellfire quantities can be determined before the numbers and types of firing platforms have stabilized. The Army decided at ASARC III to continue to annually add missiles to the last year of the POM until a firm acquisition objective can be determined. With the current planned AH-64 procurement, the missile requirement is well over 45,000 missiles. Hellfire procurement through fiscal year 1989 under the above annual addition policy would be 42,332 missiles.

AH-64 FINANCIAL RISK

Senator LEVIN. The Defense Contract Audit Agency in the past expressed concerns about the financial condition of the AH-64 prime contractor and its impact on the program. Does the Army have a contingency plan in the event the prime contractor experiences cost problems which exhaust its credit limits?

Is the Army in any way bearing the financial risk of the AH-64 program and in effect, underwriting the contractor?

General MERRYMAN. The Army is not bearing the financial risk. The Army does make progress payments up to 90 percent of incurred costs in accordance with normal Defense Acquisition Regulation procedures. No unique financial responsibilities have been assumed by the Army on Apache production contracts.

PATRIOT AIR DEFENSE SYSTEM

Senator LEVIN. Over the past 2 and one-half years, estimate's of Patriot's program costs have nearly doubled. GAO contends that some of the same factors which caused increases in the past still are present. For example, the contractor is behind schedule due to production problems. GAO also contends the Army believes funds may not be sufficient to adhere to the planned procurement schedule. What is the Army's response to these GAO contentions, and what is it doing in the Patriot program to prevent future cost increases?

ANSWER. The Army is currently reviewing in detail the total Patriot program cost estimates. An initial examination of these updated cost estimates indicates that the 15 fire units and 525 missiles planned for fiscal year 1984 can be procured for the $992.0 million requested. This review also indicated that there is a potential cost growth of about 2 percent in the Patriot procurement program. Intensive management actions have already been initiated both by the Army and Raytheon, Patriot prime contractor, to prevent further cost growth and in fact reduce the total cost of the Patriot program. These actions include a negotiated cost reduction goal achievement program, breakout of major component subcontracts to introduce competition, qualification of second-source vendors and consideration of multiyear procurement. Additional cost savings are anticipated from foreign military sales of Patriot which may begin as early as fiscal year 1984.

Senator LEVIN. The Patriot system has demonstrated continued maintainability problems. Is it not true that the system's built-in test equipment, key to rapid identification and replacement of faulty components, has successfully identified faulty components only 50 to 60 percent of the time in testing?

ANSWER. The Patriot System Specification states a [deleted] percent detection requirement of all mission-essential failures during the "on-line" operations (tactical mode). Additionally, during the "off-line" maintenance mode [deleted] percent of all failures should be isolated by means of diagnostic software programs and manual procedures. Last year, we reported the "off-line" diagnostic software and manual procedures were only isolating the fault about 50 to 60 percent of the time. Now, after more than 1600 faults have been evaluated we have observed an isolation rate of about [deleted] percent. This puts us within the progress envelope we anticipated from the maintenance improvement program we initiated last year. We anticipated achieving a [deleted] percent capability by the time Patriot is fielded in Europe in mid 1984 and over [deleted] percent a year to thereafter. Software programing technology, limited availability of Patriot equipment and time were the limiting factors restraining us from concurrent development of the software necessary to achieve the specified diagnostic capability at this point in time. As an interim corrective measure, we have added a maximum of 115 personnel worldwide at the intermediate maintenance level who will use external test equipment and detailed training to repair faults we are not yet able to isolate automatically. This is a reversion to the standard maintenance concept employed on most other systems and is not expected to result in operational problems.

Senator **Levin**. Because of this, is it not true the Army has decided to train additional personnel to maintain the system manually or with other test equipment that will not be built into the Patriot itself?

Answer. A maximum of 115 additional maintenance personnel may be added to the Patriot support system to rectify those faulty components that cannot yet be identified by built-in test equipment. Intensive corrective actions are in process to improve Patriot diagnostic capabilities. The number of support personnel actually required may decrease as the built-in test capability ultimately attained becomes known with field experience.

Senator **Levin**. GAO contends that further improvements are needed to the maintenance software before the Patriot can be adequately supported in the field. What is the Army's response to these charges?

Answer. Patriot can be adequately supported in the field today with the current maintenance software. Maintenance support is being provided by specially trained military maintenance personnel along with backup support from contractor maintenance support personnel. These contractor personnel will be available for about 2 years after Patriot is fielded and will be phased out as military maintenance personnel obtain more experience on the Patriot system. The Army also has a maintainence software improvement program underway which will improve the fault isolation capability from the currently demonstrated [deleted] percent to [deleted] percent in 1984 and [deleted] percent in the 1986 timeframe.

Senator **Levin**. GAO estimates that the contractor will not catch up to the original Patriot delivery schedule for another almost one to one and one-half years. Does the Army agree?

Answer. Deliveries of Patriot hardware from the fiscal years 1980 and 1981 production contracts are behind schedule. The delays are due to production start-up problems most of which have now been solved. Significant improvements in labor efficiency and vendor supply schedules have been achieved during 1982 and 1983. As a result of these improvements current Army estimates indicate that the Patriot ground support equipment deliveries will be back on schedule in January 1984 and missile equipment by June 1984.

Senator **Levin**. In light of all this why should the Army be permitted to increase Patriot production in either 1983 or in the fiscal 1984 program now before Congress? Wouldn't it be wiser to wait until all these problems are resolved before increasing production rates?

Answer. The Army has carefully reviewed the results of the past Defense Systems Acquisition Review Council confirmation test program conducted to date and is confident that there is minimal risk in making limited increases in the Patriot production rates for fiscal years 1983 and 1984. The test data clearly shows that nearly all the Patriot system performance problems discovered prior to the August 1980 Defense Systems Acquisition Review Council have been corrected. The total program cost savings achieved by increasing Patriot production to a more economic rate far outweigh any residual risks that may be associated with remaining at an uneconomical and inefficient production rate. If the Army keeps the fiscal years 1983 and 1984 production rate at the 50 percent production capability rate (9 vice 18 Fire Units), the program will stretch 1 to 2 years and the total program cost will increase by at least $250 million.

Senator **Levin**. GAO contends that even with projected improvements Patriot's maintainability will not be raised to the level originally required. Does the Army agree, and is that why it is training additional personnel and buying additional equipment to maintain Patriot?

Answer. The Patriot System Specification states a [deleted] percent detection requirement of all mission-essential failures during the "on line" operations (tactical mode). Additionally, during the "offline" maintenance mode [deleted] percent of all failures should be isolated by means of diagnostic software programs and manual procedures. Last year, we reported the "off-line" diagnostic software and manual procedures were only isolating the fault about 50 to 60 percent of the time. Now, after more than 1600 faults have been evaluated we have observed an isolation rate of about [deleted] percent. This puts us within the progress envelope we anticipated from the maintenance improvement program we initiated last year. We anticipate achieving a [deleted] elected percent capability by the time Patriot is fielded in Europe in mid 1984 and attain the diagnostic software goal of [deleted] percent by the end of 1986. Software programing technology, limited availability of Patriots equipment and time were the limiting factors restraining us from concurrent development of the software necessary to achieve the specified diagnostic capability at this point in time. As an interim corrective measure, we have added a maximum of 115 personnel at the intermediate maintenance level who will use external test equipment and detailed training to repair faults we are not yet able to isolate automatically. This is a reversion to the standard maintenance concept employed on most other systems and is not expected to result in operational problems.

Senator **Levin**. Have tests with the new fuze demonstrated a solution to Patriot's susceptibility to premature detonation when the Soviets dispense chaff?

Answer. The Patriot system works extremely well in the designed to chaff environment [deleted]. However, the threat community projects chaff levels [deleted] times higher than this level [deleted]. Tests performed on the current Patriot fuze indicate that the current implementation will be [deleted].

In order to improve performance, the fuze processor indicates a constant probability of target detection greater than a [deleted] for chaff levels exhibiting a density up to [deleted] with less than 15 percent degradation in the probability of detection for a chaff level of [deleted]. In addition to the number of simulations already perfomed on the Patriot system utilizing the [deleted] such that the [deleted].

Senator **Levin**. Has the Army identified a modification to Patriot to improve its performance against the potential Soviet countermeasure of [deleted]. When will this modification be ready to build into Patriot and how many missiles will have been produced before this modification is available?

Answer. Some [deleted] for the current system. Software modifications incorporated through the Pre-planned Product Improvement programs for the April 1985 software release [deleted]. Additional improvements are currently being investigated. The currently planned modifications required to implement these improvements only involve changes to Patriot system software. Therefore there will not be a requirement to modify any missiles which have already been produced.

M1 TANK PROGRAM

Senator **Levin**. The proposed cut in M1 production rates in fiscal year 1984 and for the remainder of the program delays achieving the Army's 7058 M1 tank inventory objective by several years and adds significant costs to the program, does it not? Please provide a detailed breakout as to the delays in M1 deliveries and their impact on Army combat readiness and as to the increased costs to the program.

Answer. The stretch-out of the M1 program was an affordability decision and was taken so funding for a balanced Army program would be available. The program was not cut back because of producibility, quality problems, or anything else but affordability.

Specifically, and compared to the estimates in the fiscal year 1983 President's budget, the additional costs of the stretch-out program total about $800 million (this figure derived from the difference between December 1981 and December 1982 Selected Acquisition Report totals).

On a unit cost basis, the increases average about $113 thousand per tank in escalated dollars for all 7058 M1s and M1E1s in the initial buy.

These increases would have been significantly greater had it not been for major reductions in the Office of the Secretary of the Defense/Office of Management and Budget inflation projections, on which outyear escalation is projected. Cost savings within the M1 program, such as multiyear contracts, reduced unit hardware costs, and savings based on the increased buy in fiscal year 1983 are also major factors in holding down cost growth. Unfortunately, the costs associated with the program stretch-out mask these cost reduction trends.

The Army estimates that with the reduced Office of the Secretary of Defense/Office of Management and Budget inflation projections, full use of appropriate multiyear contracts, and a continuation of the hardware cost reduction trend, a production rate of 90 per month would reduce current program cost estimates by $1.5 to 2 billion.

There is some delay in fielding active units but, the delays in deliveries will primarily be to the war reserves and Prepositioned Materiel Configured in Unit Sets (POMCUS) not to fielding active units. As a result sustainability, rather than readiness will be affected.

Senator **Levin**. M1 production is set at 855 in fiscal year 1983 and the Army now is proposing a 720 tank purchase in fiscal year 1984. Won't this reduction cause unnecessary turbulence in the production line and the work force at both tank plants?

Answer. No. The turbulence will not be a major problem since the nominal monthly production rate will only vary from 60 per month to 67 per month, split between two sites. The impact on the workforce will be minimal. The funded delivery period also varies between twelve and twelve and three-quarter months for the two buys so that in reality, there are larger variations in month-to-month production caused by holiday and vacation periods, than there are by the 135 differential in tanks.

Senator LEVIN. It is my understanding that the Army has done a cost benefit analysis which demonstrates that consolidating M1 tank production at one tank plant actually will cost the government approximately $81.9M more in the long run. Is this true, and would you provide details for the record?

ANSWER. It is true a copy of the analysis is attached.

DEPARTMENT OF THE ARMY
PROGRAM MANAGER, ABRAMS TANK SYSTEM, DARCOM,
WARREN, MICHIGAN 48090

3 DEC 1982

DRCPM-GCM-P

SUBJECT: Single Plant to Produce the Abrams Tank

1. PROBLEM. To determine if it is prudent to close one tank plant and produce Abrams tanks in a single production facility.

2. ASSUMPTIONS.

a. The plant under consideration for closing is DATP. It would be much more costly to close LATP. See Annex A, Site Selection criteria.

b. The Scranton Facility will continue to support tank production.

c. The impact of a DATP closing will have no impact on major subcontractor operations.

d. M60 tank production for FMS purposes will remain open through November 1985.

e. The cost and risk associated with Mobilization is not considered.

f. The Army Plan to accommodate a 150 tank per month surge capacity is to be modified to a lesser amount; i.e., 90 to 120.

g. The vendor base is adequate to support a partial off-load of DATP produced components during the transition period.

h. DATP can produce an adequate bank of the remaining DATP produced components prior to the transition period.

i. Additional facilities construction efforts will be executed on a priority basis.

j. Adequate funding will be programmed and made available.

k. The impacts on the specific local economies and the corresponding political ramifications are not a consideration.

3. FACTS BEARING ON THE PROBLEM.

a. LATP and DATP are interdependent.

b. Perturbation of the programmed M1 and M60 delivery schedules is unacceptable.

c. The existing production and facilitization plans which are in the execution phase are based upon LATP/DATP interdependence.

3 DEC 1982

DRCPM-GCM-P
SUBJECT: Single Plant to Produce the Abrams Tank

4. DISCUSSION.

a. LATP and DATP currently produce and deliver Abrams tanks using an interdependent tank plant concept. Each plant manufactures selected components for its own use and for use by the other plant. LATP manufactures and machines the hull and turret structures for both plants. Tank assembly, hull/turret marriage and testing operations are essentially identical at each plant. A single plant concept would require that one plant have the machinery and fixtures to perform all manufacturing operations currently performed by both plants. (NOTE: Essentially one-half of the available manufacturing floor space at LATP is dedicated to fabrication operations.) The table below shows facilities requirements of interdependent plants to a single plant. Under either concept production is dependent upon the General Dynamics Scranton (PA) and Sterling plants and other GFE suppliers e.g., engines, transmission, fire control.

Interdependent Plants

LATP	DATP
Hull/Turret fabrication	Major components manufacture
Armor fabrication	Assembly
Small components manufacture	Testing
Assembly	
Testing	

Single Plant

Hull/Turret fabrication

Armor fabrication

Major components manufacture

Small components manufacture

Assembly

Testing

b. Advantage of producing at a single location:

Potential reduced unit production cost, resulting from decreased burden, overhead and direct labor.

3 DEC 1982

DRCPM-GCM-P
SUBJECT: Single Plant to Produce the Abrams Tank

c. Disadvantages of producing at a single location:

(1) Jeopardizes stability of tank deliveries if the plant is out of operation, for any reason.

(2) Would increase facilitization costs $110 million.

(3) Jeopardizes extended turret and M1E1 deliveries. See Annex C, paragraph 2.

(4) Would require replanning to meet mobilization goals which are presently based upon plant interdependence.

(5) Would require the selected single plant to learn and become efficient at new processes.

(6) Provides little assurance that tank costs would be lower. See Annex C, paragraph 3.

d. Total facilitization costs for the M1 tank program are $1026.4 million. This represents a cost growth of over $200 million over the original plan. The single plant concept would require an estimated additional facilitization cost of $110 million. More details are at Annex B. No attempt is made to cost the risk of this venture. Total tank production from the single plant would begin approximately four years after the decision. Annex D portrays the major activities and time periods involved.

5. CONCLUSIONS.

a. That while the single plant concept has a potential for reducing unit production costs in the longer term (1987 and beyond), the turbulence caused by implementation places near term (1984-1986) Army milestones (introduction of the improved armor turret and the M1E1 system) in jeopardy.

b. That it is unlikely that a cost advantage would accrue to the Government by adoption of the single plant concept. In fact, the overall costs of establishing the single plant outweigh unit production cost benefits by $81.9 million when the 7058 total tank production is completed in 1990.

c. In any case, in order to implement, budget increases of $102.4 million in FY84 and $97.9 million in FY85 would be required.

6. ACTION RECOMMENDED. That the single plant concept not be pursued further.

Duard D Ball
DUARD D. BALL
Major General, USA
Program Manager

ANNEX

SITE SELECTION

1. LATP is the current lead manufacturing plant for the M1 and is the more economic candidate as a single production facility.

2. Disadvantages of DATP as a single production plant are:

a. Lack of available high clearance ceilings (high bays) would dictate less than optimal placement of certain machining operations and would require construction of high bay space.

b. Mirror image manufacturing at DATP would require additional non-high bay space. Upon termination of M60 production, DATP would have space excess to known requirements.

c. Much more costly to facilitize for total tank production than LATP.

d. DATP has been extensively modernized within the past two years; additional modernizations are planned through FY87.

3. Conclusion: That LATP is the best choice as a single production plant.

D

ANNEX B

FACILITIZATION

COST ESTIMATE

(60-75 MONTHLY RATE)

LATP	FY82 MILLIONS $
Engineering Requirements	22.1
Manufacturing Space Addition - 600,000 FT^2	50.9
Shipping, Material Handling, Storage (DATP Tooling to LATP)	9.5
Office Building	15.0
Plant Rearrangement/Material Handling	6.5
Parking Lot - 500,000 FT^2	1.0
Powerhouse	5.0
	110.0

ANNEX C

DISCUSSION OF ISSUES

1. Excess capacities will exist because many presently installed machines and fixtures will support rates greater than the 75 tanks per month required of one autonomous plant. For example, the LATP hull machining center and the DATP torsion bar housing center are both capacity-rated at 150 vehicle sets per month. The single production plant concept will not take advantage of these capacities.

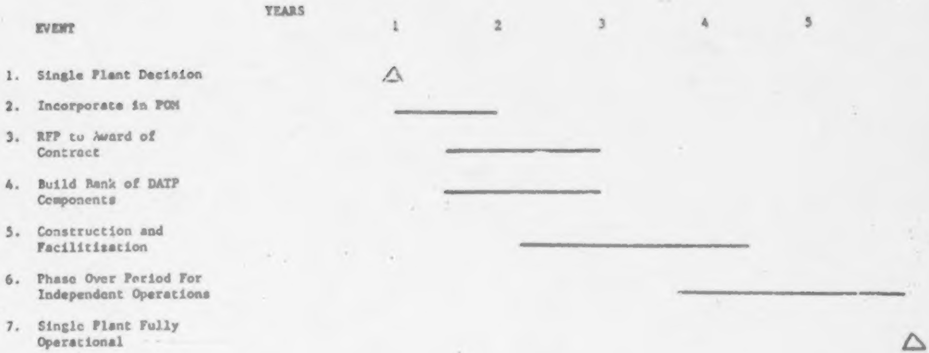
2. December 1984 and August 1985 are the current programmed delivery schedules of the modified turret Abrams Tank and the M1E1 respectively. Retooling will occur as tank production escalates. Current assessments indicate that the LATP capability for this is moderate risk but will require intensive management. Any concurrent change in production concepts will compound total risk to the program.

3. Experience has shown that cost reductions can be achieved through competition; for example, tactical missiles and fire control systems. Currently, DATP and LATP moderately compete for production of selected parts of the tank. Under the single plant concept, even this minor price advantage will be eliminated.

4. Upon completing facilitization efforts to establish a single production plant, a subsequent learning period would be required before that plant could stand on its own.

ANNEX D

EVENTS SCHEDULE



ANNEX E

COST ANALYSIS

1. GENERAL ASSUMPTIONS

a. For the purpose of this analysis, it is assumed that the Single Plant Concept will consist of an independent Production/Assembly operation at LATP using existing tooling and facilities, modified as outlined in Annex B. Any other alternative is considered much too costly.

b. Based on the time period for implementation of this concept (ie: full operation in October 1987), there would be 2436 tanks of the approved Army program of 7058 tanks impacted through program year FY90.

	FY86	FY87	FY88	FY89	FY90	Total
No. Tanks Impacted	102	720	720	720	174	2436

This analysis considers the cost impact relative to the production of these units only, assuming a continuous Army production rate of 60 per month (720 per year).

c. The nonrecurring tooling, engineering and facilitization costs associated with establishing independent production/assembly operations at LATP are estimated at $110.0 million (FY82 dollars; see Annex B).

d. In order to revert from an interdependent plant concept to a single plant production layout, it would be necessary to absorb other transition costs was well as the facilities costs.

It is estimated that $8 million of personnel relocation allowances would also be absorbed by the government. This would be primarily for transferring management and highly skilled personnel from Detroit to Lima.

Also, it would be necessary to build a bank of some components currently produced at DATP to meet LATP demands during the transition period. Some components could be off-loaded, but not all. The off-load costs are estimated at $30 million over and above the current production costs of these items, whereas, the banked items are estimated to cost another $15 million over and above the comparable DATP production cost.

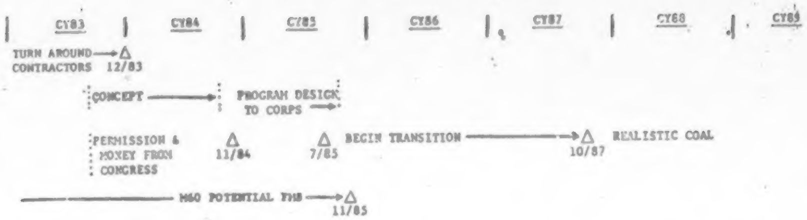
One additional cost is the maintenance of our empty DATP facility, which has been estimated by TACOM at a cost of $1.5 million per year.

e. The source of any potential cost savings is General Dynamics costs only. It is estimated that General Dynamics Land System Division costs could be reduced by about 5% by producing the tank at a 60 per month rate at a single facility, as opposed to two interdependent facilities. This equates to approximately $30 million savings per program year.

2. Table E (1) identifies the required expenditures and corresponding anticipated savings by Program Fiscal Year.

Table E (2) lists the total annual expenses and assesses the cost/savings of the concept in both discounted and undiscounted constant FY82 dollars.

TABLE E(1)
(60/MONTH RATE, COSTS IN FY82 $)


CY83
CY84
CY85
CY86
CY87
CY88
CY89
TURN AROUND CONTRACTORS
12/83
CONCEPT
PROGRAM DESIGN TO CORPS
PERMISSION & MONEY FROM CONGRESS
11/84
7/85
BEGIN TRANSITION
10/87
REALISTIC GOAL
M60 POTENTIAL FMS
11/85

START-UP COSTS, ETC. (LATP)	FY84	FY85	FY86	FY87
ENGR'G	(3.8)	(18,3)		
EXPAND PARKING LOT		(1.0)		
EXPAND POWER HOUSE		(5.0)		
EXPAND LATP 600K FT^2		(50.9)		
ADD'L OFFICE SPACE		(15.0)		
MOVE TOOLING		(.5)	(8.0)	(1.0)
PLANT-REARR'G			(5.0)	(1.5)
PERSONNEL RELOCATION ALLOWANCES				(8.0)

PROGRAM YEAR HARDWARE COST IMPACTS	FY84	FY85	FY86	FY87	FY88	FY89	FY90
BUILD BANK OF DATP COMPONENTS	(75.0)	(-40.0)	(-20.0)	-			
PARTIAL OFF-LOAD		(20.0)	(10.0)	-			
DATP MAINT.					1.5	1.5	1.5
U/C Δ			-5.0	-30.0	-30.0	-30.0	-7.0

TABLE E(2)
(FY82 $)

COST "2436" UNITS	FY	QTY	ANNUAL EXPENSE*	ANNUAL SAVINGS	UNDISCOUNTED COST/SAVINGS	AR 11-28 DISCOUNT FACTOR	ANNUAL DISCOUNTED COST/SAVINGS	CUM DISCOUNTED COST/SAVINGS
	84	—	78.8	—	78.8	.954	75.2	75.2
	85	—	70.7	—	70.7	.867	61.3	136.5
	86	102	3.0	- 5.0	- 2.0	.788	- 1.6	134.9
	87	720	10.5	-30.0	-19.5	.717	-14.0	120.9
	88	720	1.5	-30.0	-28.5	.652	-18.6	102.3
	89	720	1.5	-30.0	-28.5	.592	-16.9	85.4
	90	174	.5	- 7.0	- 6.5	.538	- 3.5	$\boxed{81.9}$

*In order to implement, FY84 and FY85 budget increases are as follows:

	FY84	FY85
FY82 $	$78.8M	$70.7M
ESC $	$102.4M	$97.9M

Senator **Levin**. Two major developments in the M1 program are scheduled for the near future—introducing the Improved Armor Turret and upgunning the tank by producing it with the 120mm gun. I understand that the Army is concerned that consolidated of tank production in one plant might cause problems in the overall tank program and thus jeopardize successful accomplishment of these tasks. What are the Army's concerns in this area?

Answer. The Improved M1 and M1E1 programs introduction and ramp up activities would be put into serious jeopardy if consolidation to either tank plant were to occur. The impact would be less if consolidation were to be at Lima, however, with the necessary expansion, rearrangement and installation taking place, the ability to introduce new tooling and procedures for the improved M1 and M1E1 becomes very difficult. Maintaining a production level concurrently makes accomplishment of all tasks at the same time very doubtful. Some program objectives would have to slip.

Senator **Levin**. Delivery of the full 7058 M1 initial tank inventory objective already has been delayed for several years due to Defense Department budget decisions. Could consolidation of M1 production in only one plant risk even further delays in achieving this objective?

Answer. Yes. Moving the Detroit component machining capability to Lima, for example would involve a 30 to 36 month effort during which component machining capability would be impaired.. The 30-36 month time span is from the time you start expansion until you could have a full capacity installed at Lima.

Senator **Levin**. Poor quality control in production of the M1 was a significant issue several years ago. Most of the problems appear to have been solved. Is the Army concerned that consolidation of M1 production in one plant, with the requirement to teach new skills to the work force at the Lima, Ohio facility could cause a reoccurence of these quality control problems?

Answer. Yes. Quality is a function of design, quality control procedure, and people. The principal design and procedural problems are behind us; people training is a challenge but we have come along way down the learning cure. Any major move, such as consolidation, would cause setbacks through turbulence in the workforce either through transfer of jobs and people or new hires with attendant startup training costs. An expanded, consolidated facility would also cause production flow and layout charges that could seriously degrade quality until the new finally established.

Senator **Levin**. What are the costs and risks associated with our national mobilization capabilities from consolidation of tank production at the Lima, Ohio facility?

Answer. Consolidation of tank production at the Lima, Ohio facility would necessarily reduce mobilization capability significantly. Risk and time required to mobilize would increase due to the need to add brick and mortar work to initiate any mobilization effort as opposed to having the one million square feet of Detroit Arsenal Tank Plant space ready for use. Cost of mobilization would also increase due to the need for facilities expansion at that time.

Senator **Levin**. Would the Army expect a negative impact on major M1 subcontractor operations from consolidation of tank production at Lima?

Answer. Yes, to the extent lead times and transportation would need to be reassessed. Major subcontractors would not be subtantially impacted but smaller vendors for piece-parts would probably require a complete new structure to economically support a consolidated plant.

METHANOL AND ALCOHOL FUELS

Senator **Levin**. What is the position of the Army on the use of methanol and other alcohol fuels in its mobility equipment and mobile power generator equipment?

Answer. The Army position on the use of new mobility fuels including alcohol fuels is to conduct programs to qualify, validate and develop specifications for such fuels on time scales such that Army vehicles and equipment will be able to use them when they become commercially available.

Senator **Levin**. What goals does the Army have to use alternate mobility fuels, specifically alcohol fuels?

Answer. Army has established the goal and is proceeding in conducting engine qualification and operational validation of shale-derived diesel projecting toward its 1984 commercial availability. The Army completed engine qualification and operational validation of gasohol in June 1982. Goals have not been established for other alcohol fuels because projections have not been established of their commercial availability.

Senator **Levin**. What programs are in place and planned for the future to accomplish these goals?

Answer. The Army conducts engine qualification and operational validation of new fuels in the following research, development, test and evaluation program elements.

Task/project	*Program element*
Combustor research	61102A
Research combat support	61102A
Engine concepts for alternative fuels	62601A
Mobility equipment technology	62733A
Fuels and equipment	63104A
Engine concepts for alternative fuels	63702D

Senator **Levin**. What level of funding is necessary to carry these programs thru to completion?

Answer. Funding levels in Army new fuel qualification and operational validation programs is largely influenced by guidance form the Office of the Deptuy Secretary of Defense of Research and Advanced Technology which administers and coordinates the overall DOD program. This office is currently developing a DOD plan to document coordinated specific military department program goals with milestones and funding resources necessary for completion. Projections of Army funding resources required to carry programs to completion are currently being developed as a part of the Defense Mobility Fuels Plan.

Senator **Levin**. The committee has learned that the Army is about to deploy a methanol fueled-fuel cell in its family of mobile power generators. Please provide the status of this effort?

Answer. Completion of developmental and operational testing and full scale development of the 1.5 KW Methanol Fuel Cell Silent Power unit [MFC] is scheduled for fiscal year 1985. If testing is successful, procurement would begin in fiscal year 1985 and initial deployment would occur in the fiscal year 1987 time frame.

Senator **Levin**. The committee has also learned that the Ford Motor Company is producing 800 authomobiles that can run on 100 percent methanol. Would it be advisable for the Army, which is the lead military service for ground vehicles, to procure a portion of these vehicles for test and evaluation as part of a fleet test demonstration program?

Answer. The Army is in the process of converting the entire tactical vehicle fleet to diesel for greater safety and to reduce the logistical burden. All of the automobiles used by the Army, Navy and Air Force are purchased by the General Services Administration [GSA] as are automobiles for all other government agencies. The Army would favor a fleet test conducted by GSA to determine suitability of 100 percent methanol fuel vehicles for all agencies.

Senator **Levin**. What can the Army do in conjection with the Synthetic Fuels Corportaion to obtain sufficient fuel to support such program?

Answer. The Army does not interface directly with the Synthetic Fuels Corporation. Defense mobility fuels are procured for the Army by the Defense Fuels Supply Center.

Senator **Levin**. Is the Army in favor of mobility fleet test programs utilizing (1) 100 percent methanol-fueled vehicles and (2) 100 percent shale-derived fueled vehicles?

Answer. When projected dates of commercial availability are established, Army would conduct engine qualification and fleet tests as necessary of 100 percent methanol-fueled vehicles and 100 percent shale-derived fuel vehicles to evaluate the "worst case" conditions for use of these fuels.

Senator **Levin**. What is the Army doing with the Synthetic Fuels Corporation and The Defense Fuel Supply Center to obtain alternate mobility fuels for test programs using alcohol and shale derived fuels.

Answer. The Army does not interface directly with the Synthetic Fuels Corporation. The Army is currently developing plans with the Defense Fuel Supply Center to qualify and validate shale-derived diesel fuels. Projections have not been provided to Army by the Defense Fuel Supply Center on the future commercial availability of alcohol fuels other than Gasohol.

[The prepared statement by Lt. Gen. James Merryman, "Other Procurement, Army" follows:]

STATEMENT BY LT. GEN. JAMES H. MERRYMAN (FISCAL YEAR 1984 OTHER PROCUREMENT, ARMY)

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE, IT IS A PLEASURE TO PROVIDE YOU A SUMMARY OF THE OTHER PROCUREMENT, ARMY (OPA) APPROPRIATION BUDGET REQUEST FOR FY 84. WITHOUT TRUCKS, TRAILERS, COMMUNICATIONS AND ELECTRONICS EQUIPMENT, ENGINEER AND LOGISTICS EQUIPMENT AND OTHER ELEMENTS OF SUPPORT EQUIPMENT PROCURED WITH THIS APPROPRIATION THE COMBAT FORCES JUST COULD NOT FUNCTION. THESE ITEMS ARE OF VITAL IMPORTANCE TO THE ARMY.

AS THE OPA TITLE IMPLIES, EQUIPMENT FROM THIS APPROPRIATION IS OTHER THAN TANKS, AIRCRAFT, MISSILES, AND AMMUNITION--THE VISIBLE, IMPRESSIVE, AND CONVENTIONAL HARDWARE. I DON'T THINK IT BEGS THE ISSUE TO SAY THAT EQUIPMENT FROM THIS APPROPRIATION CONSTITUTES THE NAIL, THE SHOE, AND IN SOME CASES THE HORSE, FOR THE WANT OF WHICH A KINGDOM WAS LOST, TO PARAPHRASE THAT OLD TRUISM. NONE OF THESE ITEMS SHOOT, OR EXPLODE. BUT WITHOUT THEM, THE TANKS, GUNS, MISSILES, AIRCRAFT, AND COMBAT FORCES THEMSELVES WON'T OPERATE FOR LONG.

THE FOLLOWING FIGURE AND TABLE SHOW THE DISTRIBUTION OF OPA FUNDS BY BUDGET ACTIVITY FOR FISCAL YEARS 1982 THROUGH 1985 AS PRESENTED IN THE FY 1984 PRESIDENT'S BUDGET.

OTHER PROCUREMENT ARMY
FY 84 PRESIDENT'S BUDGET
(DOLLARS IN BILLIONS)

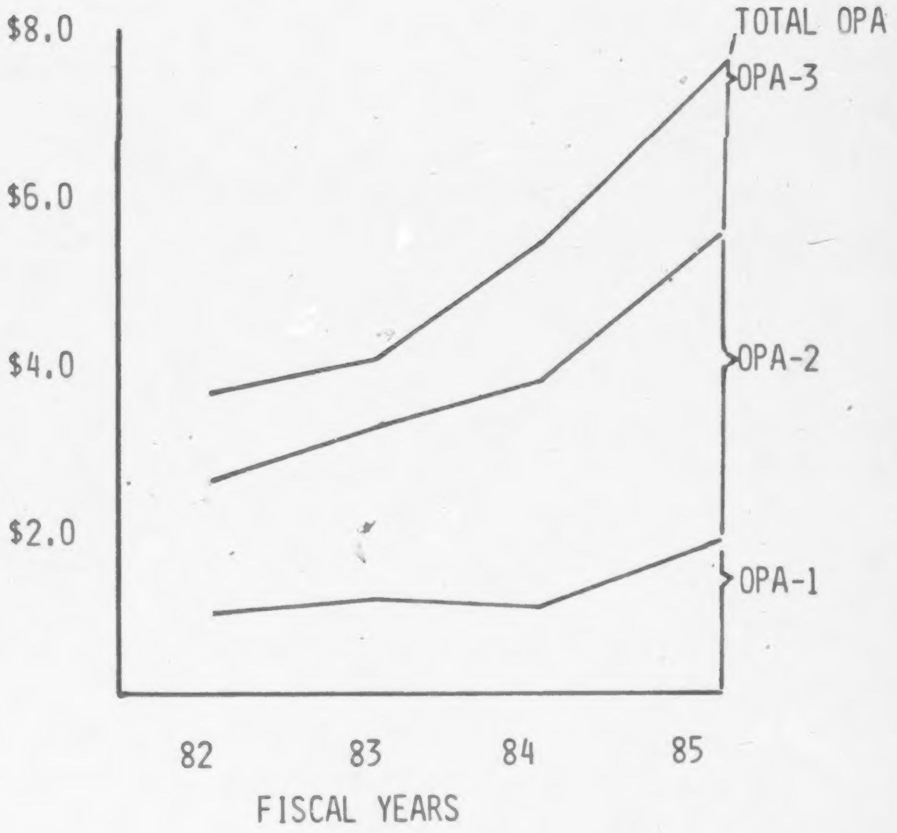


FIGURE 2

TABLE 1

FY 1984 REQUEST BY BUDGET ACTIVITY

ACTIVITY	TITLE	MILLIONS OF DOLLARS
1	TACTICAL & SUPPORT VEHICLES	$1,148.1
2	COMMUNICATIONS & ELECTRONICS	2,781.2
3	OTHER SUPPORT EQUIPMENT	1,433.6
	TOTAL	$5,362.9

BUDGET ACTIVITY I (OPA I), TACTICAL AND SUPPORT VEHICLES, COMPRISES 21% OF THE TOTAL FY 84 REQUEST AND CONSISTS OF ABOUT 15 DIFFERENT TYPES OF VEHICLES. AS SHOWN IN THE FOLLOWING CHART, THE FY 84 OPA 1 REQUEST IS APPROXIMATELY $82 MILLION OR 7% LESS THAN THE FY 83 OPA 1 FUNDED PROGRAM.

OPA 1 - TACTICAL AND SUPPORT VEHICLES
FY 84 PRESIDENT'S BUDGET
(DOLLARS IN MILLIONS)

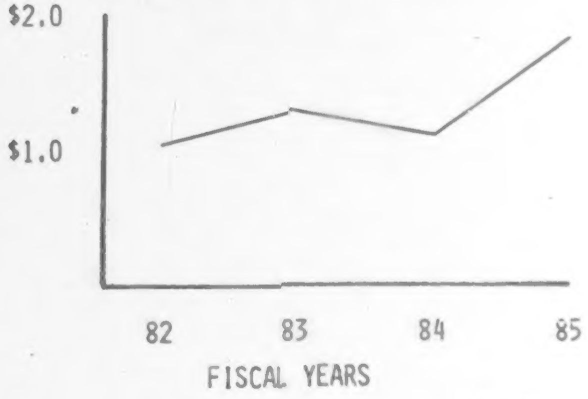


FIGURE 2

RATHER THAN A REDUCED PRIORITY OF OUR WHEELED VEHICLE PROGRAM, THIS SMALL REDUCTION IN THE OPA 1 PROGRAM REFLECTS THE TRADE OFFS THAT MUST BE MADE WHEN OPERATING WITHIN A CONSTRAINED LEVEL OF FUNDING.

DISTRIBUTION OF THE FY 19 84 OPA 1 PROGRAM BY FUNCTIONAL AREA IS AS SHOWN IN THE FOLLOWING TABLE. FIGURE 3 SHOWS THE FUNDING FOR EACH OF THE KEY PROGRAMS.

BUDGET ACTIVITY 1
TACTICAL AND SUPPORT VEHICLES
FY 84 PRESIDENT'S BUDGET

FUNCTIONAL AREA	MILLIONS OF DOLLARS
TACTICAL VEHICLES	$981.9
NON-TACTICAL VEHICLES	57.4
SUPPORT EQUIPMENT AND FACILITIES	108.8
TOTAL	$1,148.1

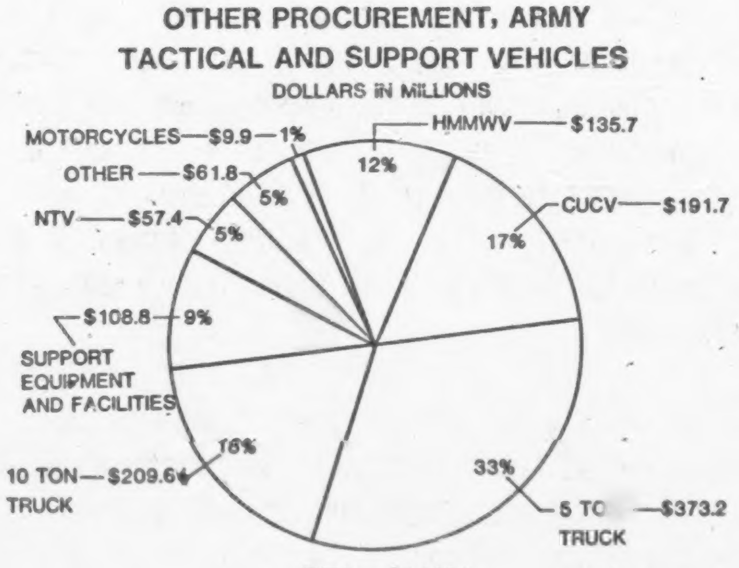


FIGURE 3

THE ARMY'S REQUIREMENT FOR TRANSPORTATION IS OF CONSIDERABLE MAGNITUDE. WEAPONS REQUIRE AMMUNITION, FUEL, AND REPAIR PARTS; THE SOLDIERS WHO MAN THESE WEAPONS MUST BE SUPPORTED; REPLACEMENT STOCKS AND RESERVE EQUIPMENT MUST BE BROUGHT FORWARD; DAMAGED EQUIPMENT MUST BE EVACUATED; AND A LONG SERIES OF LOGISTICS ACTIONS MUST BE ACCOMPLISHED TO SUSTAIN AND MAINTAIN OUR FORCES IN A COMBAT-READY STATUS. ONE DIVISION AND ITS SUPPORTING SLICE IN ONE DAY OF COMBAT CAN BE EXPECTED TO CONSUME APPROXIMATELY 2700 TONS OF AMMUNITION, 500,000 GALLONS OF FUEL, 50 TONS OF RATIONS, AND 111 TONS OF OTHER KINDS AND CLASSES OF SUPPLIES. NOW IT TAKES ABOUT 800-1000 TRUCKS AND TRAILERS TO MOVE THESE SUPPLIES INTO THE

DIVISION AREA, AND THIS 800-1000 DOES NOT INCLUDE THE ADDITIONAL APPROXIMATELY 5000 5/4-, 2 1/2-, 5-, AND 10-TON TRUCKS, TRACTORS, AND TRAILERS ACTUALLY ORGANIC TO THE DIVISION. NOW IF YOU EXTEND THE TRUCK REQUIREMENTS TO THE TOTAL 24-DIVISION ARMY, AND THEN INCLUDE OTHER FORCE ELEMENTS, SUCH AS SEPARATE BRIGADES AND REGIMENTS, TRANSPORTATION, TRAINING, AND SUPPORT GROUPS, AS WELL AS WAR RESERVES, THE MAGNITUDE OF OUR TRANSPORTATION REQUIREMENT CAN BE APPRECIATED.

IN OCTOBER 1980 WE SUBMITTED TO CONGRESS OUR TACTICAL WHEELED VEHICLE FLEET REQUIREMENTS STUDY, WHICH ASSESSED THE ARMY'S OVERALL VEHICLE REQUIREMENTS AND DEFINED THE MOST PRODUCTIVE FLEET, SHOWN IN FIGURE 4. THIS FLEET DELETES THE 1/4-TON M151 JEEP, 1/2-TON M274 MULE, 5/4-TON M561 GAMA GOAT, 5/4-TON M880 SERIES COMMERCIAL TRUCK AND THE 8-TON GOER. IT RETAINS THE 5/4-, 2 1/2-, 5-, AND 10-TON VEHICLES AS WELL AS SELECTED LINEHAUL AND EQUIPMENT TRANSPORTERS. THIS FLEET REDUCES THE TYPES OF VEHICLES WHILE MAINTAINING OUR OVERALL COMBAT EFFECTIVENESS AND READINESS. WE HAVE MOVED IN A DELIBERATE AND POSITIVE MANNER TO IMPLEMENT THE FINDINGS OF THE STUDY IN FY 81, 82 AND 83. THE FY 84 BUDGET REQUEST REFLECTS THE ARMY'S CONTINUING COMMITMENT TO UPGRADING OUR FLEET.

1983

TACTICAL WHEELED VEHICLE FLEET
CURRENT VS PLANNED

CURRENT		WEIGHT CLASS (TONS)		PLANNED	
VEHICLE	CONFIGURATION	CURRENT	PLANNED	VEHICLE	COMPETITION BASIS*
M151 (JEEP)	MILITARY	1/4		HMMWV	PERF SPEC
M274 (MULE)	MILITARY	1/2			
M561 (GAMA GOAT)	MILITARY	5/4	5/4		
M880 SERIES	COMMERCIAL	5/4		CUCV	PERF SPEC
M35 SERIES	MILITARY	2 1/2	3 - 3.5	MTT	PERF SPEC
M809 SERIES	MILITARY	5	5	M939 SERIES	TDP
M565 SERIES	MILITARY	5	10	HEMTT SERIES	PERF SPEC
M520 (GOER)	MILITARY	8		M.A.N. SERIES	PERF SPEC

(+)TRACTORS, TRAILERS, EQUIPMENT TRANSPORTERS AND SPECIAL PURPOSE.

*PERF SPEC = PERFORMANCE SPECIFICATION.
TDP = TECHNICAL DATA PACKAGE.

FIGURE 4

1984

KEY VEHICLE PROGRAMS EMPHASIZED IN THE FY 84 REQUEST ARE AS FOLLOWS:

IN 1981, COMPETITIVE FIXED PRICE 5-YEAR, CONVENTIONAL MULTI-YEAR CONTRACTS WERE AWARDED FOR 5- AND 10-TON TRUCKS. IN 1982, A COMPETITIVE FIXED PRICE 4-YEAR CONVENTIONAL MULTI-YEAR CONTRACT WAS AWARDED INITIATING THE COMMERCIAL UTILITY AND CARGO VEHICLE PROGRAM (CUCV). THE CUCV IS COMPLEMENTARY TO THE HIGH MOBILITY MULTIPURPOSE WHEELED VEHICLE (HMMWV) PROGRAM IN WHICH WE PLAN TO AWARD A CONVENTIONAL 5-YEAR MULTI-YEAR CONTRACT DURING THE SECOND QUARTER OF FY 83. THE CUCV AND HMMWV ARE TWO COMPLEMENTARY VEHICLE FAMILIES WHICH IMPLEMENT OUR 5/4-TON FLEET UPGRADE STRATEGY.

IT IS PARTICULARLY IMPORTANT TO POINT OUT THAT OUR PROCUREMENTS IN MANY CASES DO NOT REPLACE OVER-AGE VEHICLES IN OUR TACTICAL FLEET. WE ARE SO SHORT OF OUR REQUIREMENTS THAT WE MUST KEEP MANY OF THESE OLDER VEHICLES ON HAND UNTIL WE HAVE SUFFICIENT VEHICLES TO REPLACE THEM.

IN ADDITION TO THESE MORE VISIBLE TACTICAL TRUCK PROGRAMS, WE ALSO HAVE IMPORTANT PROGRAM INITIATIVES IN NONTACTICAL VEHICLES AS WELL AS SOME SMALLER PROGRAMS SUCH AS THE MOTORCYCLE, SEVERAL TRAILERS AND THE FAST ATTACK VEHICLE. THE BUDGET REQUEST FOR TACTICAL VEHICLES COMPRISES 88% OF THE TACTICAL AND SUPPORT VEHICLES PORTION OF THE OTHER PROCUREMENT, ARMY APPROPRIATION, AND THE 5-TON, 10-TON, AND 5/4-TON TRUCK PROGRAMS THEMSELVES ACCOUNT FOR A MAJORITY OF THAT EFFORT.

OF CONCERN TO US IS THE OVER-AGE STATUS OF OUR FLEET. THE ORIGINAL LIFE EXPECTANCY ESTIMATES FOR OUR TACTICAL TRUCKS WERE MADE DURING THEIR DEVELOPMENT PHASE BASED ON EXPECTED USAGE AND DESIGN TECHNOLOGY. SUBSEQUENTLY, THE ARMY MATERIEL SYSTEMS ANALYSIS AGENCY (AMSAA) PERFORMED USEFUL LIFE STUDIES FOR TACTICAL TRUCKS (1/4-TON, 2 1/2-TON, 5-TON), BASED ON MILEAGE EXTRAPOLATION, RATHER THAN AGE, AND USED SAMPLE SIZES OF VEHICLES WHICH HAD NOT YET REACHED THEIR PREDICTED LIFE EXPECTANCY. BASED ON THE AMSAA STUDIES, THE USEFUL LIVES OF THE 1/4-TON, 2 1/2-TON, AND 5-TON TRUCK SYSTEMS WERE EXTENDED AS FOLLOWS: 1/4-TON--FROM 7 YEARS TO 12 YEARS; 2 1/2-TON--FROM 12 YEARS TO 15 YEARS; AND 5-TON--FROM 15 YEARS TO 20 YEARS. THE ARMY HAS IMPLEMENTED A DATA COLLECTION PROGRAM TO SUPPORT ANALYSES TO ESTABLISH ECONOMIC REPLACEMENT CRITERIA FOR OUR TACTICAL VEHICLES. WE DO KNOW NOW THAT WITHIN THE CURRENT VEHICLE LIFE EXPECTANCIES THAT BODIES RUST OUT, RUBBER ROTS AND DETERIORATES, AND CERTAIN VEHICLE COMPONENTS AND SPARE PARTS BECOME DIFFICULT TO BUY. IN MANY CASES, REBUILD AND REMANUFACTURE OF COMPONENTS BEYOND NORMAL MAINTENANCE PRACTICE IS REQUIRED TO KEEP THE OLDER VEHICLES IN OUR FLEET OPERATIONAL. WHILE WE HAVE NOT TIED THESE LIFE EXPECTANCIES TO ECONOMIC BREAKPOINTS, OUR EXPERIENCE WITH OUR OLDER VEHICLES CAUSES US CONCERN ABOUT GOING INTO COMBAT WITH VEHICLES THAT ARE OF SUCH EXTENDED AGE.

OUR NONTACTICAL FLEET PROCUREMENT COMPRISES LESS THAN 5% OF THE TACTICAL AND SUPPORT VEHICLE PROCUREMENT PROGRAM. THE NON-TACTICAL VEHICLE FLEET INCLUDES STANDARD, COMMERCIAL PRODUCTION VEHICLES SUCH AS PICKUP TRUCKS, MAINTENANCE AND SERVICE VEHICLES, CARRYALLS, REFUSE AND DUMP TRUCKS, SEDANS, ETC. THE RELATIVELY LOW PRIORITY ACCORDED TO PROCUREMENT OF THESE VEHICLES RELATIVE TO OTHER REQUIREMENTS HAS CREATED PROBLEMS WITH THIS FLEET. THE STANDARDS FOR LIFE AND MILEAGE CRITERIA HAVE BEEN EXCEEDED IN MANY CASES. COMMERCIAL VEHICLES WITH OVER A 100,000 MILES ARE NOT UNCOMMON. AS A RESULT WE PAY THE PRICE OF HIGHER DOWNTIMES, INCREASED COSTS, AND DIVERSION OF THE TACTICAL FLEET TO MEET URGENT ADMINISTRATIVE NONTACTICAL MISSION REQUIREMENTS.

THE OTHER FUNCTIONAL AREA WITHIN OPA 1 IS SUPPORT EQUIPMENT AND FACILITIES. THE $108.8 MILLION REQUESTED IN FY 84 INCLUDES $6.2 MILLION FOR PRODUCTION BASE SUPPORT AND $102.6 MILLION FOR INITIAL AND REPLENISHMENT SPARES AND REPAIR PARTS. THE FY 84 FUNDS WILL PROCURE DEPOT REPARABLE COMPONENTS (ENGINES, TRANSMISSIONS, TRANSFER CASES, AXLES, ETC.) REQUIRED TO SUPPORT FIELDING OF THE HMMWV, CUCV, FAST ATTACK VEHICLE AND NEW 5-TON AND 10-TON TRUCKS. IN ADDITION, THE FY 84 PROGRAM PROVIDES CONTINUED SPARES AND REPAIR PARTS SUPPORT FOR THE EXISTING TACTICAL VEHICLE FLEET.

THE SECOND PART OF THE OTHER PROCUREMENT, ARMY APPROPRIATION IS BUDGET ACTIVITY 2, COMMUNICATIONS AND ELECTRONICS EQUIPMENT. THIS BUDGET ACTIVITY CONSTITUTES 52% OF THE ENTIRE OTHER PROCUREMENT, ARMY APPROPRIATION, AND IS DEVOTED TO PROCUREMENT OF THE ARMY'S COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE (C^3I) EQUIPMENT. OUR C^3I SYSTEMS MUST PROVIDE THE CAPABILITY REQUIRED TO TRANSFORM INDIVIDUAL WEAPONS SYSTEMS INTO AN INTEGRATED, EFFECTIVE FORCE. THESE SYSTEMS MUST SATISFY THE NEEDS OF OUR FORCES

TO OBSERVE, PROVIDE WARNING AND ATTACK ASSESSMENT, PROCESS INFORMATION, SUPPORT DECISION-MAKING, COMMUNICATE, NAVIGATE, AND DENY OR DEGRADE THE ENEMY'S ABILITY TO PERFORM THESE ESSENTIAL FUNCTIONS. THE URGENCY OF FIELDING THESE CAPABILITIES IS UNDERSCORED BY THE NEED FOR WORLDWIDE EXECUTION UNDER CONDITIONS THAT RANGE FROM DAY-TO-DAY PEACETIME OPERATIONS THROUGH ALL LEVELS OF CONFLICT.

THE VARIETY AND COMPLEXITY OF OUR C^3I NEEDS PRESENT THE ARMY WITH AN EXTREMELY CHALLENGING MANAGEMENT TASK. IN RESPONSE TO THAT CHALLENGE, THE ARMY CONTINUES TO PURSUE TWO MAJOR INITIATIVES TO IMPROVE OUR ABILITY TO MANAGE, PROCURE AND OPERATE C^3I SYSTEMS:

o A TOTAL INTEGRATED WEAPONS/C^3I SYSTEMS APPROACH. IN PARTICULAR, WE ARE REVIEWING END-TO-END FUNCTIONAL REQUIREMENTS FOR THE C^3I MISSION AREA TO INSURE WE HAVE THE PROPER MIX OF WEAPONS SYSTEMS AND C^3I SYSTEMS.

o DESIGNING AND DEPLOYING ENHANCED, ROBUST, STATE-OF-THE-ART C^3I SYSTEMS WHICH, WITH EMPHASIS ON SURVIVABILITY AND ENDURANCE, CAN RESIST THE CURRENT AND PROJECTED SOVIET THREAT AND NOT PERMIT HIM TO DEGRADE THE SURVIVABILITY AND ENDURANCE OF OUR ASSOCIATED WEAPONS SYSTEMS.

THE OPA 2 FUNDING PROFILE FOR FY 82 THROUGH FY 85 IS SHOWN IN THE FOLLOWING FIGURE.

OPA 2 - COMMUNICATIONS AND ELECTRONICS EQUIPMENT
FY 84 PRESIDENT'S BUDGET
(DOLLARS IN BILLIONS)

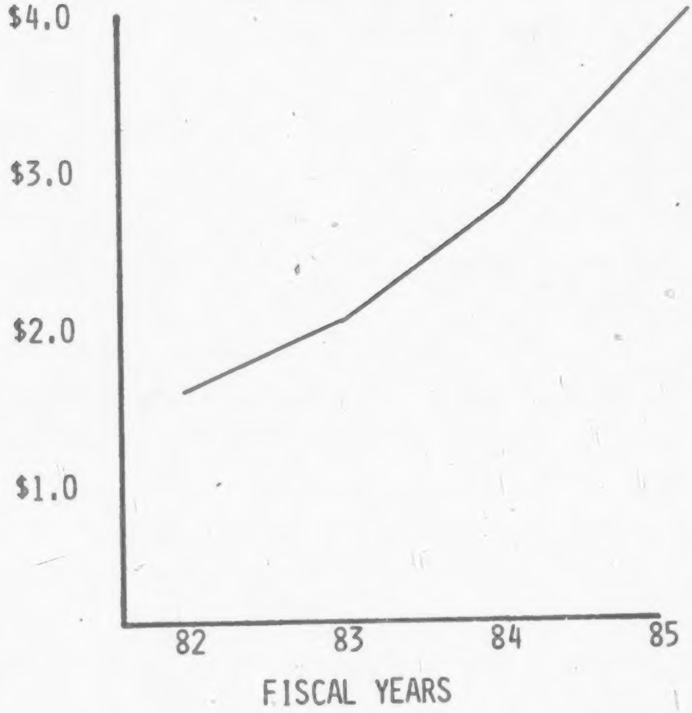


FIGURE 5

OUR PRINCIPAL C^3I FUNCTIONAL AREAS ARE AS FOLLOWS:

TABLE 3

BUDGET ACTIVITY 2 - COMMUNICATIONS AND ELECTRONCIS EQUIPMENT

FY 84 PRESIDENT'S BUDGET

FUNCTIONAL AREA	(MILLIONS OF DOLLARS)
TACTICAL COMMUNICATIONS	$ 920.8
STRATEGIC COMMUNICATIONS	412.5
SURVEILLANCE AND TARGET ACQUISITION	278.8
COMMAND AND CONTROL (C2) AUTOMATIC DATA PROCESSING EQUIPMENT	231.5
INTELLIGENCE/ELECTRONIC WARFARE	262.8
SPARES, PRODUCTION BASE SUPPORT AND SPECIAL PROGRAMS	674.8
TOTAL	$ 2781.2

OTHER PROCUREMENT, ARMY
COMMUNICATIONS AND ELECTRONICS EQUIPMENT
DOLLARS IN MILLIONS

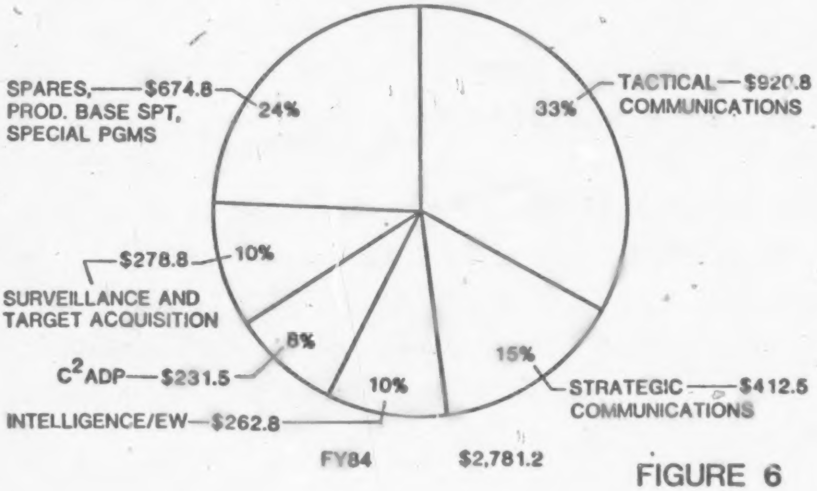


FIGURE 6

THE REQUEST IS $737.2M MORE THAN THE FY 83 APPROPRIATION. OVER HALF OF THIS INCREASE ($391.3M) IS TO START PROCUREMENT OF VITALLY NEEDED SYSTEMS

C^3I IS A FIELD IN WHICH THE U.S. POSSESSES A DEGREE OF TECHNOLOGICAL EXPERTISE THAT IS THE ENVY OF THE WORLD; HOWEVER, DUE TO AFFORDABILITY CONSTRAINTS, THE ARMY'S FIELDED EQUIPMENT DID NOT KEEP PACE WITH THIS TECHNOLOGY DURING THE 1970's. WE PLAN TO CLOSE THIS GAP DURING THE DECADE OF THE 1980's AS WE MOVE FROM AN ERA OF GREASE PENCILS AND MANUAL SWITCHBOARDS TO ONE IN WHICH THE ARMY'S ENTIRE C3 NETWORK WILL BE MODERNIZED.

THESE SYSTEMS ARE NEEDED NOW TO ALLOW OUR SOLDIERS TO MORE EFFECTIVELY TRANSMIT AND RECEIVE VOICE AND DATA COMMUNICATIONS IN A SECURE, JAM-RESISTANT MODE, AND TO DETECT, INTERCEPT AND TARGET ENEMY ACTIVITIES ON THE BATTLEFIELD, AND TO PROCESS THIS INFORMATION TO AID THE DECISION MAKING PROCESS.

SOME REPRESENTATIVE PROGRAMS THAT CONSTITUTE A LARGE PORTION OF THE FY84 REQUEST ARE EXPLAINED BELOW:

IN THE AREA OF TACTICAL COMMUNICATIONS, THE JOINT TACTICAL COMMUNICATIONS PROGRAM (TRI-TAC) REQUEST OF $373.7M SUPPORTS THE PROCUREMENT OF A NUMBER OF DIVERSE EQUIPMENTS SUCH AS TACTICAL DIGITAL/ANALOG SWITCHES, MULTICHANNEL LINE-OF-SIGHT/TROPOSCATTER RADIOS, MULTIPLEXERS AND TELEPHONES. THESE PROCUREMENTS ARE

URGENTLY NEEDED TO REPLACE THE OBSOLETE, NON-SECURE, MANPOWER INTENSIVE AND PREDOMINANTLY MANUAL COMMUNICATIONS EQUIPMENT CURRENTLY IN THE FIELD. AFTER YEARS OF EFFORT, THE PRODUCTION OF THESE TRI-TAC EQUIPMENTS WILL BEGIN TO PROVIDE OUR TACTICAL COMMANDERS AND THEIR FORCES SECURE VOICE, AND DATA COMMUNICATIONS FOR COMMAND AND CONTROL OF COMBAT OPERATIONS. IN ADDITION, BOTH THE SINGLE CHANNEL GROUND AND AIRBORNE RADIO SYSTEM (SINCGARS) AND THE POSITION LOCATING REPORTING SYSTEM (PLRS) BUDGET REQUESTS ($50.8M AND $35.3M RESPECTIVELY) WILL SUPPORT PRODUCTION AT MORE ECONOMIC PRODUCTION RATES THAN PREVIOUSLY PLANNED. THIS NOT ONLY CAUSES THESE ENDURING, ANTIJAM C^3I CAPABILITIES TO BE FIELDED MORE QUICKLY BUT ALSO RESULTS IN SIGNIFICANT COST SAVINGS.

FOR STRATEGIC COMMUNICATIONS, THE REQUEST OF $189.5M FOR THE DEFENSE SATELLITE COMMUNICATIONS SYSEMS (DSCS) PROCURES IMPROVED SATELLITE TERMINAL FACILIITES FOR THE DEFENSE COMMUNICATIONS SYSTEM (DCS) IN SUPPORT OF CRITICAL DEPARTMENT OF DEFENSE (DOD) COMMAND AND CONTROL SYSTEMS. MAJOR PROCUREMENT ITEMS IN THE DSCS PROGRAM ARE TO SUPPORT THE THIRD YEAR OF A FOUR YEAR BUY OF SATELLITE TERMINAL EQUIPMENTS TO SATISFY THE JAM-RESISTANT SECURE COMMUNICATIONS (JRSC) REQUIREMENTS. THESE INCLUDE THE PURCHASE OF TWO (2) AN/GSC-49 TERMINALS AND ONE (1) STATE-OF-THE-ART MEDIUM SATELLITE TERMINAL (SAMT). IN ADDITION, $35.7M IS BEING REQUESTED FOR THREE (3) JOINT CRISIS MANAGEMENT CAPABILITY (JCMC) TERMINALS. THE JCMC WILL PROVIDE AIR-TRANSPORTABLE COMMUNICATIONS THAT CAN BE FLOWN INTO REMOTE

CRISES AREAS TO PROVIDE THE ON-SCENE JOINT COMMANDER NECESSARY EQUIPMENT TO COMMUNICATE WITH HIS DESIGNATED COMMANDER IN CHIEF (CINC) OR THE NATIONAL COMMAND AUTHORITY (NCA).

IN THE SURVEILLANCE AND TARGET ACQUISITION AREA, $46.8M IS REQUESTED TO RESTART, AT ECONOMIC RATES, THE PRODUCTION OF THE GROUND LASER LOCATOR DESIGNATOR (GLLD). GLLD WILL PROVIDE ACCURATE RANGE, AZIMUTH, AND ELEVATION INFORMATION FOR USE WITH CONVENTIONAL ARTILLERY AND PROVIDE LASER DESIGNATION TO ENABLE HIGH SINGLE SHOT KILL PROBABILITY WITH LASER TERMINAL HOMING WEAPONS. AN UNATTENDED GROUND SENSOR SYSTEM, THE REMBASS BEGINS PROCUREMENT. THE $20.4M REQUESTED IS TO PROCURE TWO (2) RAPID DELPOYMENT FORCE SETS AND ONE (1) SET FOR AN ADDITIONAL ARMY DIVISION. REMBASS WILL PROVIDE THE TACTICAL COMMANDER, NOW FACED WITH WIDE FRONTAGES, A CAPABILITY TO SEE DEEP ON THE GROUND. THUS, RELIANCE ON LONG RANGE SECURITY PATROLS TO ACCOMPLISH THIS MISSION WILL BE LESSENED. REMBASS WILL PROVIDE BOTH FORWARD AREA EARLY WARNING/SURVEILLANCE INTRUSION DETECTION (PHYSICAL SECURITY), AND A TARGET DEVELOPMENT CAPABILITY. CLOSE COMBAT AT THE FORWARD LINE OF OUR TROOPS WILL BE ENHANCED WITH VARIOUS NIGHT VISION AIDS AND SIGHTS (FOR A TOTAL OF $88.5M), DESIGNED TO INCREASE THE NIGHT-FIGHTING EFFECTIVENESS OF TROOPS ENGAGED IN ESSENTIAL TASKS, SUCH AS PATROLLING, DRIVING VEHICLES AND OPERATING INDIVIDUAL AND CREW-SERVED WEAPONS. THE NIGHT VISION DEVICES INCORPORATE STATE-OF-THE-ART CHANGES WHICH HAVE IMPROVED MISSION PERFORMANCE CHARACTERISTICS, INCREASED

DEPENDABILITY, AND HAVE LOWERED LIFE CYCLE COSTS. THE CURRENT TRANSITION FROM SECOND TO THIRD GENERATION DEVICES AND THE EMPLOYMENT OF COMMON COMPONENTS AMONG THE VARIOUS DEVICES ARE TWO FACTORS WHICH FAVOR THE MAINTENANCE OF A NIGHT VISION EQUIPMENT PRODUCTION BASE.

IN THE COMMAND AND CONTROL (C^2) AUTOMATIC DATA PROCESSING AREA, THE DECENTRALIZED AUTOMATED SERVICE SUPPORT SYSTEM (DAS 3) REQUEST IS FOR $52.0M. THESE FUNDS CONTINUE PRODUCTION OF THIS SYSTEM PROVIDING FORTY-EIGHT (48) GENERAL PURPOSE COMPUTER EQUIPMENTS (DAS-3) UTILIZED FROM BRIGADE TO THEATER TO PROCESS STANDARDIZED PERSONNEL AND LOGISTICAL FUNCTIONS. ANOTHER TYPICAL EXAMPLE OF CONTINUING PRODUCTION IS THE $29.4M REQUESTED TO PROCURE THE BATTERY COMPUTER SYSTEMS (BCS). BCS PROVIDES FIRE CONTROL AND BALLISTIC CALCULATIONS AT THE FIELD ARTILLERY BATTERY LEVEL PLACING AN URGENTLY NEEDED, AUTOMATED, FIRE SUPPORT CAPABILITY ON THE BATTLEFIELD. ONE OTHER EXAMPLE OF A SYSTEM WHICH WILL FILL AN URGENT REQUIREMENT ON THE BATTLEFIELD AND HAS JUST RECENTLY MATURED FROM RDTE TO PROCUREMENT (FY83) IS THE METEROLOGICAL DATA SYSTEM (MDS). THIS SYSTEM REPLACES A FORTY YEAR OLD MANUAL SYSTEM WITH AN AUTOMATED SYSTEM THAT PROVIDES ACCURATE AND TIMELY METEROLOGICAL DATA TO THE FIELD ARTILLERY, A MOST IMPORTANT INGREDIENT FOR ACCURATE ARTILLERY FIRE. THE FY84 REQUEST OF $19.3M WILL BUY 12 MDS.

IN THE INTELLIGENCE/EW AREA, $67.7M IS REQUESTED TO START PROCUREMENT OF THE TRAILBLAZER (AN/TSQ-114). FIELDING THIS

SYSTEM WILL PROVIDE COMMANDERS A VERY MOBILE, AUTOMATED, HIGH SPEED MEANS TO INTERCEPT AND EXPLOIT ENEMY COMMUNICATIONS BY ADDING A CAPABILITY THAT DOES NOT CURRENTLY EXIST. THIS CAPABILITY IS ESSENTIAL IF THE ARMY COMMANDER IS TO SEE THE BATTLEFIELD AND EFFECTIVELY DEPLOY HIS FORCES TO DEFEAT THE MAIN ENEMY THREATS.

ANOTHER PROGRAM, THE HAND EMPLACED EXPENDABLE JAMMER (HE-EXJAM), WILL START PRODUCTION IN FY 84. THE $19.3M REQUESTED WILL PROVIDE THE ARMY A NEW AND UNIQUE, LOW COST APPROACH TO EFFECTIVELY DEGRADE OR DENY ENEMY RADIO COMMUNICATIONS. THESE DEVICES CAN ELIMINATE ENEMY COMMUNICATIONS AT SPECIFIC LOCATIONS ON THE BATTLEFIELD AND AT SPECIFIC TIMES THAT THE COMMANDER DETERMINES MOST CRITICAL TO OPERATIONS. IN ADDITION, BECAUSE HE-EXJAM OPERATES ON LOW POWER AND IS EMPLACED BEYOND THE FRONT LINE OF TROOPS, FRIENDLY COMMUNICATIONS WILL NOT BE DISRUPTED.

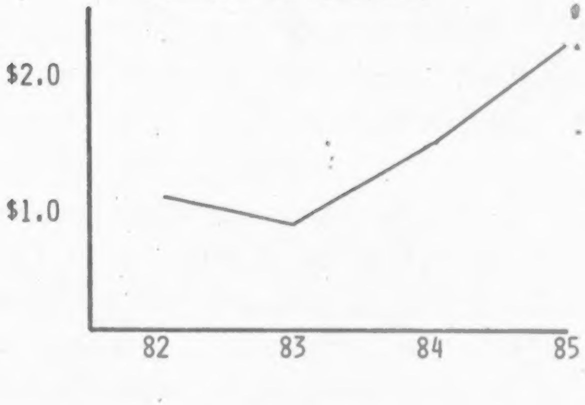
IN THE SPARES AREA, THE REQUEST CONSISTS PRIMARILY OF THE INITIAL AND REPLENISHMENT SPARE PARTS FOR ALL OF THE COMMUNICATIONS - ELECTRONICS EQUIPMENT CONTAINED IN THE BUDGET. THESE ITEMS ARE ESSENTIAL AND FAILURE TO FUND THE REQUIRED INITIAL AND REPLENISHMENT SPARES WILL RESULT IN DEGRADATION TO OUR READINESS POSTURE AND SUSTAINABILITY.

THIS CATEGORY ALSO CONTAINS FUNDS FOR PRODUCTIVITY ENHANCEMENT AND PRODUCTION BASE SUPPORT PROJECTS AND FOR CERTAIN PROGRAMS REQUIRING SPECIAL ACCESS.

AS YOU CAN SEE, DURING FY84, WE CONTINUE OUR INITIATIVES AIMED AT EFFECTIVELY AND AFFORDABLY IMPROVING OUR C^3I CAPABILITIES. OUR MODERN SYSTEMS RELY ON THE MOVEMENT OF LARGE AMOUNTS OF VOICE, DATA AND MESSAGE TRAFFIC FOR A VARIETY OF USES, RANGING FROM THE TACTICAL COMMANDER ON ONE END OF THE SPECTRUM TO INDIVIDUAL WEAPONS SYSTEMS ON THE OTHER END. THE COMMANDERS INFLUENCE MUST BE CONTINUOUS IN ORDER TO CONTROL AND WIN THE BATTLE. THIS MEANS WE MUST HAVE MODERN COMMUNICATIONS SYSTEMS WHICH ARE RELIABLE AND CAN SURVIVE. IF THE ARMY IS TO FIGHT OUTNUMBERED AND WIN, THE COMMANDER MUST BE ABLE TO DETERMINE THE ENEMY'S INTENTIONS AND DEPLOY HIS FORCES TO COUNTER THEM. DELAYING OR CANCELLING PROCUREMENT OF THESE SYSTEMS WILL DENY OUR COMMANDERS THESE CAPABILITIES IN THE NEAR TERM AND WEAKEN OUR ABILITY TO WIN ON THE BATTLEFIELD.

EQUALLY CRITICAL WITHIN THE OPA APPROPRIATION IS BUDGET ACTIVITY 3 (OPA 3), OTHER SUPPORT EQUIPMENT. WHILE OPA 3 MAY BE THE LEAST GLAMOROUS OF THE ARMY PROCUREMENT ACCOUNTS, IT IS ONE THAT WITHOUT WHICH WE MAY NOT GET TO WAR, AND WOULD NOT BE ABLE TO SUSTAIN OUR COMBAT FORCE. IT CONTAINS THE LESS VISIBLE ITEMS, THE NUTS AND BOLTS, THAT HOLD AN ARMY TOGETHER AND KEEP IT GOING. THE OPA 3 FUNDING PROFILE FOR FY 82 THROUGH FY 85 IS SHOWN BELOW.

OPA 3 - OTHER SUPPORT EQUIPMENT
FY 84 PRESIDENT'S BUDGET
(DOLLARS IN BILLIONS)



FISCAL YEARS

FIGURE 7

THE OPA-3 FUNDING PROFILE ABOVE, FIGURE 7, SHOWS A DECREASE OF APPROXIMATELY $249 MILLION OR 23% IN THE FUNDED LEVEL FROM FY 82 TO FY 83. THE RESULT IS AN APPARENT STEEP INCREASE IN THE FY 84 REQUEST OVER THE FY 83 APPROPRIATION. HOWEVER, A COMPARISON OF THE FY 84 REQUEST TO THE FY 82 APPROPRIATION FOR OPA 3 FINDS AN INCREASE OF ABOUT $350 MILLION DOLLARS OR AN AVERAGE INCREASE OF APPROXIMATELY 16% PER YEAR OVER THE TWO-YEAR PERIOD. THE REDUCED FY 83 ARMY REQUEST WAS NECESSARY TO ALLOCATE AVAILABLE RESOURCES IN THE MOST EFFICIENT MANNER CONSIDERING ARMY PRIORITIES AND MINIMUM FUNDING REQUIREMENTS FOR EFFECTIVE EXECUTION OF ESSENTIAL PROGRAMS.

FOR EASE OF ANALYSIS AND MANAGEMENT, THE FY 84 OPA 3 BUDGET REQUEST HAS BEEN GROUPED INTO 13 FUNCTIONAL AREAS WHICH PROVIDE SUPPORT ACROSS MANY LINES. THE PREPAREDNESS PROVIDED BY EACH OF THESE AREAS IS ESSENTIAL IF THE COMBAT FORCE IS GOING TO OPERATE EFFECTIVELY AND BE SUSTAINED. DISTRIBUTION OF THE FY 84 PROGRAM IS AS SHOWN IN THE FOLLOWING TABLE AND FIGURE 8:

TABLE 4

BUDGET ACTIVITY 3 -OTHER SUPPORT EQUIPMENT

FY 84 PRESIDENT'S BUDGET

FUNCTION AREA	MILLIONS OF DOLLARS
CHEMICAL DEFENSIVE EQUIPMENT	$ 61.0
BRIDGING EQUIPMENT	30.9
ENGINEER (NON-CONSTRUCTION) EQUIPMENT	75.0
COMBAT SERVICE SUPPORT EQUIPMENT	42.6
PETROLEUM EQUIPMENT	47.8
WATER EQUIPMENT	12.0
MEDICAL EQUIPMENT	151.6
MAINTENANCE EQUIPMENT	85.5
CONSTRUCTION EQUIPMENT	281.4
RAIL, FLOAT AND CONTAINERIZATION EQUIPMENT	81.7
GENERATORS	101.6
MATERIALS HANDLING EQUIPMENT	73.8
OTHER SUPPORT EQUIPMENT	387.7
TOTAL	1,433.6

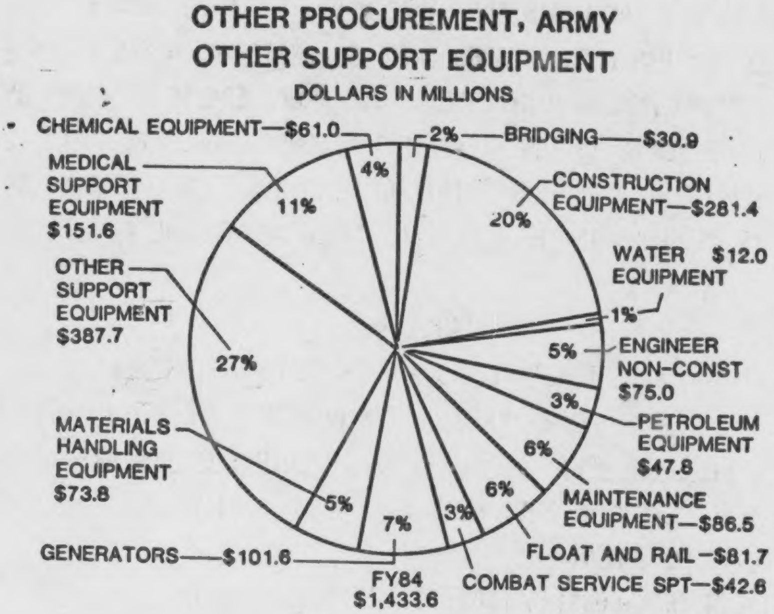


FIGURE 8

THE FY 84 REQUEST OF $61.0 MILLION FOR CHEMICAL DEFENSIVE EQUIPMENT REPRESENTING ABOUT 4% OF THE TOTAL OPA APPROPRIATION BUYS BADLY NEEDED CHEMICAL-BIOLOGICAL PROTECTION, DETECTION, WARNING, DECONTAMINATION AND CONTAMINATION AVOIDANCE EQUIPMENT. THE CHEMICAL DEFENSIVE EQUIPMENT TO BE BOUGHT IN FY 84 MUST BE AVAILABLE FOR U. S. COMBAT FORCES TO SURVIVE IF REQUIRED TO FIGHT IN A CHEMICALLY CONTAMINATED ENVIRONMENT.

THE $30.9 MILLION REQUESTED IN FY 84 BRIDGING EQUIPMENT SUPPORTS THE SECOND YEAR OF A CONVENTIONAL MULTI-YEAR CONTRACT FOR RIBBON BRIDGE TRANSPORTERS AND RESUMES BUYING RIBBON BRIDGE BAYS.

WHILE THE FY 84 BRIDGING PROGRAM IS 3 TIMES GREATER THAN THE FY 83 PROGRAM, IT IS $13.4 MILLION OR 30% LESS THAN THE FY 82 BRIDGING PROGRAM. THE LOW FY 83 FUNDED LEVEL REFLECTS COMPLETION OF THE MEDIUM GIRDER BRIDGE PROGRAM IN FY 82 AND A SKIP YEAR IN PROCUREMENT OF RIBBON BRIDGE SECTIONS TO PHASE BRIDGE DELIVERIES WITH DELIVERIES OF RIBBON BRIDGE TRANSPORTERS.

IN THE ENGINEER (NON-CONSTRUCTION) EQUIPMENT FUNCTION AREA, $75.0 MILLION IS REQUESTED MAINTAINING THE PRIOR YEAR FUNDING LEVEL TO: CONTINUE CONVENTIONAL MULTI-YEAR PROCUREMENT PROGRAMS FOR THE POSITION/AZIMUTH DETERMINING SYSTEM, TOPOGRAPHIC SUPPORT SYSTEM AND MINE CLEARING ROLLER; AND A SINGLE YEAR CONTRACT FOR THE GROUND EMPLACEMENT MINE SCATTERING SYSTEM (GEMSS). THESE SYSTEMS ARE REQUIRED BY COMBAT ENGINEERS TO PROVIDE ESSENTIAL COMBAT SUPPORT TO THE FIGHTING FORCE. IN ADDITION, THE FY 84 PROGRAM INITIATES A COMPETITIVE MULTI-YEAR PROGRAM FOR THE M-9 ARMORED COMBAT EARTHMOVER. WE WILL HAVE A VALIDATED TECHNICAL DATA PACKAGE TO ~~SUPPORT~~ COMPETITIVE PROCUREMENT. WE SHOULD GET A GOOD PRICE.

THE $42.6 MILLION REQUESTED FOR THE COMBAT SERVICE SUPPORT FUNCTIONAL AREA PROVIDES FOR CONTINUED ACQUISITION OF NUMEROUS ITEMS. INCLUDED ARE AIR CONDITIONERS REQUIRED TO SUPPORT THE FIELDING OF MISSILE SYSTEMS, COMMUNICATIONS AND ELECTRONICS SYSTEMS, AND MAINTENANCE SETS. IN ADDITION, THE FY 84 REQUEST INCLUDES FUNDS TO BUY COMPRESSORS, FIRETRUCKS, HEATERS, PRINTING

AND BINDING EQUIPMENT, AND DIVING EQUIPMENT. EACH OF THESE DIVERSE ITEMS SERVE A DISTINCT AND ESSENTIAL FUNCTION IN SUSTAINING OUR COMBAT FORCES.

THE FY 84 PETROLEUM EQUIPMENT PROGRAM OF $47.8 MILLION CONTINUES MULTI-YEAR PROGRAMS FOR ESSENTIAL PETROLEUM STORAGE AND DISTRIBUTION EQUIPMENT. IN ADDITION, THE FUNDS REQUESTED WILL INITIATE PROCUREMENT OF THE RDF POL DISTRIBUTION SYSTEM, AN OPERATIONAL PROJECT INCLUDING PIPELINE AND STORAGE FACILITIES REQUIRED FOR THE ARMY TO PERFORM THE ASSIGNED MISSION OF DISTRIBUTING BULK PETROLEUM PRODUCTS TO ALL LAND BASED FORCES IN THE RAPID DEPLOYMENT JOINT TASK FORCE (RDJTF).

THE FY 84 REQUEST INCLUDES $12.0 MILLION TO CONTINUE BUYING TACTICAL WATER DISTRIBUTION SYSTEMS IN SUPPORT OF THE LONG-RANGE PHASE II PROGRAM TO PROVIDE WATER STORAGE AND DISTRIBUTION EQUIPMENT TO SUPPORT THE RDJTF.

THE FY 84 REQUEST OF $151.5 MILLION FOR MEDICAL EQUIPMENT REPRESENTS AN INCREASE OF 28% OVER THE FY 83 PROGRAM. THIS ESSENTIAL FUNCTIONAL AREA PROVIDES FOR PROCUREMENT OF INVESTMENT EQUIPMENT FOR BOTH ARMY FIXED MEDICAL FACILITIES AND FIELD MEDICAL UNITS WORLDWIDE. INCLUDED IS MEDICAL CARE AND SUPPORT EQUIPMENT FOR NEW MILITARY CONSTRUCTION PROGRAMS AS WELL AS FOR RENOVATION AND MODERNIZATION PROJECTS. PROGRAMMED FUNDS WILL EQUIP AND MODERNIZE THE FIELD MEDICAL FORCE INCLUDING BOTH HOSPITALS AND MEDICAL FIELD UNITS. THIS FUNCTIONAL AREA ALSO

FUNDS PROCUREMENT OF ENVIRONMENTAL CONTROL SYSTEMS, TACTICAL SHELTERS AND THE EXTENDABLE, MODULAR SHELTERS REQUIRED TO FIELD THE ARMY COMBAT ZONE HOSPITALS. RECENT EXERCISES AND CAPABILITY ASSESSMENTS HAVE SHOWN THE ARMY'S MEDICAL CAPABILITY TO SUPPORT OUR GROUND FORCES IS MARGINAL. THE FY 84 REQUEST IS ESSENTIAL TO EQUIPPING AN AUSTERE MEDICAL FORCE STRUCTURE. WITHOUT IT, FIELD MEDICAL SUPPORT WOULD BE INADEQUATE, WOULD PREVENT PROPER TREATMENT OF CASUALTIES, AND WOULD RESULT IN THE SEVERE EROSION OF MANPOWER ASSETS THAT COULD BE RETURNED TO DUTY WITHIN A THEATER OF OPERATIONS. EVEN WITH FULL FUNDING, IT WILL BE SEVERAL YEARS BEFORE THE MEDICAL FORCE STRUCTURE IS ADEQUATELY EQUIPPED TO MEET MINIMAL SUPPORT REQUIREMENTS.

THE FY 84 REQUEST OF $86.5 MILLION FOR MAINTENANCE EQUIPMENT REPRESENTS A SUBSTANTIAL INCREASE OVER THE FY 83 PROGRAM OF $13.5 MILLION. THIS INCREASE REFLECTS THE INCREASED EMPHASIS WE ARE PLACING ON READINESS. INCLUDED IN THIS PROGRAM IS THE INITIATION OF CONVENTIONAL MULTI-YEAR CONTRACTS FOR WELDING AND GENERAL PURPOSE MAINTENANCE SHOPS AND A SINGLE YEAR CONTRACT FOR THE HYDRAULIC TOOL REPAIR OUTFITS. FOR THESE THREE MAINTENANCE SETS, ASSETS ON HAND ONLY FILL 36% OF OUR REQUIREMENT AND OVER 56% OF THESE ASSETS ARE OVER-AGE AND OBSOLETE. THE MAINTENANCE EQUIPMENT TO BE PROCURED IN FY 84 IS NEEDED TO INCREASE THE READINESS OF MAINTENANCE UNITS, A GOAL TO WHICH THE ARMY IS COMMITTED.

CONSTRUCTION EQUIPMENT REPRESENTING APPROXIMATELY 20% ($281.4 MILLION) OF THE OPA 3 REQUEST IS OF MAJOR SIGNIFICANCE. THE FY 84 PROGRAM IS THE THIRD YEAR OF A STANDARDIZATION EFFORT TO FILL EXISTING SHORTAGES AND REPLACE OVER-AGE EQUIPMENT FOR 8 MAJOR COMBAT CONSTRUCTION ITEMS. THIS STANDARDIZATION EFFORT UTILIZES SEPARATE COMPETITIVE MULTI-YEAR CONTRACTS TO PURCHASE A SINGLE COMMERCIAL ITEM FOR EACH OF THE 8 MAJOR PIECES OF EQUIPMENT. WHEN STANDARDIZATION IS COMPLETED, IT WILL SIGNIFICANTLY INCREASE THE READINESS OF OUR COMBAT ENGINEER UNITS. IN ADDITION, THE FY 84 PROGRAM PROVIDES FOR COMPETITIVE PROCUREMENT OF THE SMALL EMPLACEMENT EXCAVATOR (SEE), A HIGHLY MOBILE ITEM OF ENGINEER EQUIPMENT TO MEET INCREASED MOBILITY REQUIREMENTS.

IN ADDITION TO TRUCKS, IT MUST BE EMPHASIZED THAT WATERCRAFT, RAILCARS, AND THE CONTAINERIZATION PROGRAMS ARE ESSENTIAL IN MOVING COMBAT TROOPS, COMBAT EQUIPMENT, AND THEIR SUPPLIES FROM HOME STATION TO THE POINT OF DEBARKATION FROM CONUS AND FINALLY TO THE POINT OF EMBARKATION ON A FOREIGN SHORE. AVAILABLE AIR ASSETS ARE INSUFFICIENT TO MOVE THE TOTAL TONNAGE REQUIREMENTS; THUS, WATERCRAFT MUST FERRY THE COMBAT CONTINGENT TO SHORE FROM THEIR DEEP-DRAFT SHIPS. THE ARMY IS THE EXECUTIVE AGENT FOR THE DEFENSE RAIL INTERCHANGE FLEET, AND THUS PROCURES THE LIMITED ASSETS NECESSARY TO MOVE REQUIREMENTS AND MEET NECESSARY MOBILIZATION REQUIREMENTS WHICH CANNOT BE MET BY THE CURRENT COMMERCIAL RAIL FLEET THROUGH LEASING AGREEMENTS. THE SHORTAGE IS DUE TO A LACK OF FREE ASSETS AND NONAVAILABILITY OF

FLATCARS HAVING AN ADEQUATE LOADING RATING AND PROPER DECK CONFIGURATION. THESE TRANSPORTATION ITEMS REPRESENT $81.7 MILLION OR 6% OF THE OTHER PROCUREMENT, ARMY REQUEST FOR FY 84. INCLUDED IS THE INITIATION OF MULTI-YEAR CONTRACTS FOR COMPETITIVE PROCUREMENT OF A COMMERCIAL LANDING CRAFT, UTILITY (LCU) AND LOGISTIC SUPPORT VESSEL (LSV), THAT WILL PROVIDE A SIGNIFICANTLY ENHANCED LOGISTICS-OVER-THE-SHORE (LOTS) CAPABILITY.

THE FY 84 REQUEST OF $73.8 MILLION FOR THE MATERIAL HANDLING FUNCTIONAL AREA INCREASES THE PREPAREDNESS OF MOVING AMMUNITION AND OTHER SUPPLIES RAPIDLY. IT SUPPORTS THE COMBAT FORCE WHETHER IT BE AT FIXED LOCATIONS OR IN SUPPORT OF THE RAPID DEPLOYMENT FORCE BEING SUPPORTED BY LOGISTICS-OVER-THE-SHORE (LOTS). THE FORKLIFTS REQUIRED TO MOVE THE AMMUNITION AND OTHER SUPPLIES ONTO AND OFF TRUCKS AND RAILCARS ARE A KEY LINK IN THE TOTAL ARMY TRANSPORTATION SYSTEM. THE FY 84 PROGRAM WILL BEGIN A STANDARDIZATION PROGRAM FOR FOUR DIFFERENT SIZES OF COMMERCIAL FORKLIFTS CRITICAL TO THE EFFICIENT HANDLING OF AMMUNITION.

THE FINAL OPA 3 FUNCTIONAL AREA TO BE DISCUSSED IS OTHER SUPPORT EQUIPMENT ENCOMPASSING A BROAD RANGE OF EQUIPMENT AND PROGRAMS FOR EVERYDAY OPERATION OF THE ARMY. THIS CATEGORY CONSISTING OF 7% OF THE OTHER PROCUREMENT, ARMY APPROPRIATION INCLUDES SEVEN MAJOR THRUSTS. THESE ARE: SPARES AND REPAIR PARTS, PRODUCTION BASE SUPPORT, EFFICIENCY PROGRAMS, BASE LEVEL COMMERCIAL EQUIPMENT, NON-SYSTEM TRAINING DEVICES, HOST NATION SUPPORT AND SPECIAL PROGRAMS. PROCUREMENT OF SPARES AND REPAIR

PARTS ARE SCHEDULED TO INTERFACE WITH THE PROCUREMENT OF NEW EQUIPMENT. THE PRODUCTION BASE SUPPORT PROGRAM SUPPORTS PLANNED FUTURE YEAR PROCUREMENTS. EFFICIENCY PROGRAMS INCLUDE PROJECTS FOR WHICH AMORTIZATION SCHEDULES ALLOW RECOVERY OF COST IN 4 YEARS OR LESS. ALSO INCLUDED IS THE BASE LEVEL COMMERCIAL EQUIPMENT PROGRAM WHICH IMPLEMENTS CONGRESSIONAL GUIDANCE TO USE PROCUREMENT FUNDS FOR INVESTMENT-TYPE ITEMS REQUIRED BY COMMANDS TO DO THEIR PEACETIME MISSION. TRAINING IS AN ESSENTIAL PART OF PREPAREDNESS, AND THUS THE NATIONAL TRAINING CENTER EQUIPMENT AND TRAINING DEVICES ARE ESSENTIAL TO THE COMBAT SOLDIERS IF THEY ARE TO BE PROFICIENT IN THEIR MILITARY SPECIALTIES.

IN PREPARING THE FY 84 BUDGET REQUEST, THE ARMY HAS PLACED AN INCREASED EMPHASIS ON READINESS. WE HAVE DELIBERATELY SET-OUT TO ENSURE A FASTER FILL OF PRESENT UNIT EQUIPMENT SHORTAGES IN COMMON AND SUPPORT TYPE ITEMS. IN ADDITION, THERE IS INCREASED EMPHASIS ON THE RESERVE COMPONENTS EQUIPMENT PROBLEMS, ESPECIALLY THOSE ITEMS THAT ARE IN THE OTHER PROCUREMENT SUBACCOUNTS. WE ALSO RECOGNIZE AND HAVE PLANNED FOR INCREASED REQUIREMENTS FOR COMMON SUPPORT TYPE ITEMS THAT RESULT FROM THE FIELDING OF NEW WEAPONS SYSTEMS. THE FY 84 INCREASES IN PROCUREMENT OF SUPPORT EQUIPMENT REFLECT THE IMPORTANCE OF THIS VITAL FUNCTIONAL AREA.

Mr. CARL SMITH. On behalf of Senator Goldwater, thank you very much for attending.

The hearing is adjourned.

[Whereupon, at 12 noon, the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1984

MONDAY, MARCH 14, 1983

U.S. SENATE,
SUBCOMMITTEE ON TACTICAL WARFARE,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

NAVY/MARINE CORPS TACTICAL PROGRAMS

The subcommittee met in executive session pursuant to notice, at 9 a.m., in room SR-232A, Russell Senate Office Building, Senator Barry Goldwater (chairman) presiding.

Members present: Senators Goldwater, Warner, Wilson, Levin, and Bingaman.

Staff present: Carl M. Smith, professional staff member; Willis D. Smith, deputy staff director and chief scientist for the minority; Robert S. Dotson, professional staff member; and Tamara L. Farnsworth, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; John Campbell, assistant to Senator Warner; and Peter Lennon, assistant to Senator Levin.

OPENING STATEMENT BY SENATOR BARRY GOLDWATER, CHAIRMAN

Senator **GOLDWATER**. The subcommittee will come to order.

This morning the Tactical Warfare Subcommittee meets to receive testimony from the Navy and Marine Corps on their tactical programs for 1984. We are pleased to welcome Vice Adm. Bob Schoultz, U.S. Navy, Deputy Chief of Naval Operations (Air Warfare); Vice Adm. Ernest R. Seymour, U.S. Navy, Commander Naval Air Systems Command; Lt. Gen. William Fitch, Deputy Chief of Staff for Aviation, Marine Corps; and Maj. Gen. H. G. Glasgow, Director of Operations Division, Plans, Policy, and Operations Department.

Gentlemen, before you begin I should like to mention a few programs in which this committee has particular interest.

First, I remind you in our hearings last year we expressed concern over the growing number of aircraft production lines for the Navy and Marine Corps. We are still very concerned about that number. In fact, it has gone up.

I should like to know what you have done to try to reduce it.

Second, I ask that you comment on the OPEVAL reports for F/A-18 and AV-8B.

Third, I expect to come away from this hearing with a clear understanding of the Navy-Marine Corps commitment to the development of the JVX.

Fourth, I hope you will be able to clear up for us the problem which has recently surrounded the Harm program.

Gentlemen, we are happy to have you here with us this morning. Admiral Schoultz, please begin as you see fit. All your testimony will be put in the record as if read. If you care to briefly summarize it, that is usually a quicker way to get things done.

STATEMENT OF VICE ADM. ROBERT F. SCHOULTZ, U.S. NAVY, DEPUTY CHIEF OF NAVAL OPERATIONS (AIR WARFARE), ACCOMPANIED BY VICE ADM. ERNEST R. SEYMOUR, U.S. NAVY, COMMANDER NAVAL AIR SYSTEMS COMMAND; LT. GEN. WILLIAM FITCH, MARINE CORPS DEPUTY CHIEF OF STAFF FOR AVIATION; COMMODORE JOHN C. WEAVER, U.S. NAVY, F/A-18 PROJECT MANAGER; MAJ. R. MAGNUS, U.S. MARINE CORPS, WEAPONS SYSTEMS PROGRAM COORDINATOR, AVIATION WEAPONS SYSTEMS REQUIREMENT BRANCH; COL. J. A. CREECH, U.S. MARINE CORPS, JVX PROJECT MANAGER; AND MAJ. GEN. HAROLD G. GLASGOW, U.S. MARINE CORPS, DEPUTY CHIEF OF STAFF FOR AVIATION

Admiral SCHOULTZ. Thank you, Mr. Chairman.

I have a statement, a short statement.

I am honored to be here today in my first appearance as the new DCNO (Air) to present the fiscal year 1984 procurement request for naval aircraft.

As you mentioned, I am accompanied by Lieutenant General Fitch, Marine Corps Chief of Staff for Aviation, and Vice Admiral Seymour, Commander Naval Air Systems Command.

I have submitted a written statement and ask that it be included in the record.

Senator GOLDWATER. It will.

Admiral SCHOULTZ. Thank you, sir.

[The prepared statement of Admiral Schoultz follows:]

PREPARED STATEMENT OF VICE ADM. ROBERT F. SCHOULTZ, DEPUTY CHIEF OF NAVAL OPERATIONS (AIR WARFARE)

It is my privilege today to describe briefly the composition of the Navy-Marine Corps TACAIR aviation team, and to stress the vital necessity of maintaining the viability of that team. In our budget request, we seek to strengthen Naval Aviation by balancing competing priorities to gain the most for the least investment. I am satisfied that this budget request's distribution has been done in the most efficient manner for Naval Aviation. At the outset, I want to place our budget request in the appropriate context. Please allow me to start with a few observations.

Our national wartime and crisis strategy continues to require that we maintain the ability to protect U.S. interests worldwide, at any time, in any ocean and in any level of conflict. The Naval Aviation requirements reflected in our fiscal year 1984 budget request are carefully considered in light of our ability to respond to a Soviet Navy that is extremely capable of conducting naval warfare operations anywhere, at any level of conflict. The threat of the Soviet fleet is real and growing.

The Carrier Battle Group's continued superb performance in support of our national foreign policy has been the key to those efforts' success. Ensuring our Carrier Battle Groups' ability to respond whenever and wherever they are called upon, to protect our sea lines of communication (SLOC) in time of conflict, and that they remain powerful enough to preserve peace on a daily basis is essential in providing maritime sufficiency. We have allocated Naval Aviation's resources to wartime sustainability, maintainability, and capability. We also seek to gain modernization of our existing forces and a modest increase in force levels to meet growing requirements with which we are faced. Our fiscal year 1984 budget request is a balanced plan which permits each element to interact to attain the greatest synergy for Naval Aviation.

There are four central elements which determine our force effectiveness: system readiness, the quality and quantity of people who maintain and operate the systems, the capabilities of the individual weapon systems, and our ability to sustain combat operations over a projected period.

In the area of readiness, our overall long term goal is to achieve a minimum Aircraft Mission Capable (MC) rate of 70 percent. I am pleased to report that our readiness trends are moving positively in that direction. We averaged 62 percent MC in fiscal year 1982 and forecast 65 percent in fiscal 1984. One of the prime elements in material readiness is aviation spares. The fiscal year 1984 budget request for both spares and component repair funds is increased over the fiscal year 1983 levels as part of our ongoing effort for higher readiness and sustainability. Our current data show that past investments in this area are starting to pay off in increased availability. Additionally, we have trimmed to the minimum those resources required to ensure that our aviators obtain adequate flight hours to maintain the proficiency necessary for them to perform their warfare missions. Readiness continues to be the watchword of our resource allocations and this budget request, coupled with our ongoing efforts, will keep Naval Aviation moving in the right direction.

The previous positive efforts of the administration and the Congress to insure adequate pay and allowances have combined to lessen the critical shortage of trained petty officers and aviators in our force; I must hasten to caution that we are not out of the woods yet in our retention and quality of personnel problems. We must never lose sight of the fact that our greatest assets have been and will remain our superb team of men and women—without them all else is for nought. I elicit your support in continuing to approve programs that are vital to the retention of skilled people in Naval Aviation.

The last two elements in our effectiveness equation are the capability of our weapon systems and adequate force levels to sustain operations. With delivery of USS *Vinson,* our current carrier force consists of 13 deployable carriers, one in SLEP and the training carrier, USS *Lexington.* We have 12 airwings assigned to those carriers and are standing up the 13th carrier's airwing during this year. Introduction of USS *T. R. Roosevelt* in fiscal year 1987 will bring total deployable carriers to 14, at which time we plan a 14th airwing. When CVN-72 enters service in 1990 we will have 15 carriers and 14 carrier wings. CVN-73 will enter service in 1992 and will replace the *Coral Sea* in the fleet to sustain and fully support the force of 15 carriers.

In addition to these central effectiveness issues, the fiscal year 1984 budget request supports a complement of formidable aircraft that will provide the capabilities to assure the achievement of control of the seas and projection of power ashore. The F-14 Tomcat is still the most capable fleet air defense fighter of the Free World. The A-6 Intruder provides an all-weather, medium attack capability second to none. With the addition of the F/A-18 Hornet, that complements the F-14 and provides the hitherto totally lacking flexibility to perform both fighter and strike missions, the CVBG is much stronger, offensively and defensively. This very capable aircraft is a true force multiplier, greatly enhancing airwing capabilities. The Battle Group's integral ASW protection resides in the S-3 and SH-3 aboard our carriers and our Lamps helicopters onboard our surface combatants. These, and other aircraft, will continue to be modified and upgraded to meet current and emerging threats. They will also be outfitted to launch an impressive array of air-to-air and air-to-surface weapons, including the Phoenix, Sparrow, Sidewinder, Harm, Harpoon and Laser Maverick. Supported by KA-6D tankers, early warning E-2C Hawkeyes, jamming EA-6B Prowlers, reconnaissance equipped aircraft, and replenished by our improved C-2A carrier-onboard-delivery aircraft, we will continue to put to sea a force capable of convincing potential adversaries that predictable loss from military action will far exceed expected gains.

It is well documented that we have not been procuring aircraft in the last decade in sufficient quantities to maintain our force structure. Despite increased funding allocated to the defense budget, affordability continues to be a crucial issue in improving Naval Aviation. We will have to continue balancing funds between the all important improvement of current systems. One of the most cost-effective methods of achieving better capabilities at lower investment is realized through our aircraft modification program, funded in Budget Activity 5.

An area that, with concentrated extra effort, can save us many dollars and, more importantly irreplaceable lives is aviation safety. The safety record of 1982 continued to improve and was significantly better than 1981, which was our previous best year. The improvements over the past several years represent significant savings in lives and destroyed aircraft. A comparison of 1982 with 1981 statistics reveals a one-year cost avoidance savings in aircraft alone of approximately $120 million. I am confident that the emphasis which is placed on aviation safety at all levels will insure continued improvement.

Our goal is to build a credible force—perceived as credible—which employs tactics and strategies which enable us to fight intelligently and effectively. That includes not only insuring a strong, capable naval air arm, but an ongoing, practiced interoperability with our sister services which provides ever-increasing capabilities in combined arms efforts. With your continued support, we shall insure our ability to attain and sustain that goal.

Admiral SCHOULTZ. I would like to briefly describe the composition of the Navy-Marine Corps TACAIR aviation team, and to stress the vital necessity of maintaining the viability of that team.

The Naval Aviation requirements reflected in our fiscal year 1984 budget request are carefully considered in light of our ability to respond to a Soviet navy that is extremely capable of conducting naval warfare operations anywhere they choose, at the highest levels of conflict.

The threat of the Soviet fleet is real and growing. Ships of the *Kiev* and *Kirov* classes, as well as the new *Typhoon* submarine only serve to underscore that growing threat.

I would like to now present our tactical aviation program by mission area, i.e., strike warfare (attack), anti-air warfare (AAW), antisubmarine warfare (ASW), and, last, but of vital importance, our support aircraft.

STRIKE WARFARE MISSION

To begin with, I would like to present our strike warfare mission, or how we project Naval power. Today, our strike aircrews and aircraft are presented increasingly sophisticated Soviet threats against which they may have to fly. That threat includes both surface-to-air guns and missiles, ashore as well as onboard Soviet surface combatants. Soviet systems we are seeing deployed now, such as the SAN-6 surface-to-air missile system, have longer range, improved low altitude capability, multimode guidance systems, and overlapping layers of defense. Their ships and land targets are becoming increasingly hardened.

At present we employ two attack aircraft in our active carrier air wings—the light attack A-7E Corsair and medium attack A-6E Intruder.

Our active A-7E squadrons will transition to the F/A-18 strike fighter which will allow some of those Corsairs to be transferred to the Naval Reserve starting in fiscal years 1986 and 1987. Some of our reserve light attack squadrons will also transition to the F/A-18 in fiscal year 1984 to meet our commitment to a horizontally integrated Active/Reserve Force.

The A-6 Intruder is the only medium attack carrier-based aircraft in the U.S. inventory equipped for locating and striking fixed or moving targets, day or night, especially in inclement weather.

The A-6E is particularly well-suited for the war-at-sea, power projection, and deep interdiction tasks of both our Navy and Marine Corps attack squadrons.

The Intruder has been in the inventory for over two decades, but it has been constantly improved and modernized and remains one of today's most versatile and capable attack aircraft. Weapon delivery accuracy is greatly improved in target recognition attack multisensor [TRAM] configured Intruder's through the use of FLIR for precise aimpoint selection and laser ranging and by on-board target designation for use with laser-guided weapons.

The AV-8B Harrier fulfills the U.S. Marine Corps requirement for an advanced V/STOL attack aircraft for future force projection capability. This unique aircraft will provide responsive close air support for the ground commander by combining the speed and firepower of a modern jet attack aircraft with unrestrained basing flexibility.

Fleet introduction of the F/A-18 strike fighter this year will bring an aircraft with quantum improvements in terms of reliability and maintainability, allowing us to reduce our support manpower requirements.

The Hornet, with its fighter and attack capabilities, will add a tremendous measure of flexibility to our carrier air wings.

The F/A-18's fighter performance has been demonstrated against a broad spectrum of adversaries. It is a winner. Air-to-ground system development is still in progress at the Naval Air Test Center, but numerous air-to-ground deployments by our fleet replacement squadron have fully demonstrated the superior attack capabilities of the F/A-18.

The Continuing Resolution Act [CRA] directed the Navy to submit a plan for incorporation of a U.S. manufactured ejection seat in the F/A-18. The Department of the Navy has submitted a plan to the Committees on Appropriations which will result in a competitive procurement program to deliver seats for installation by 1986.

The total additional cost to proceed with that program will not be known until the competitive results are available.

The Hornet meets the Navy performance requirements for the strike fighter mission. It has demonstrated an operational combat radius of 450.

Senator GOLDWATER. Pardon me. Is that 450 miles in attack mode or fighter mode?

Admiral SCHOULTZ. Actually it is in the attack role. It is an interdiction role. We have transitioned the first Marine squadron and the second one should stand up this month. We look forward to integrating that fine weapon system in our carrier wings.

We have come a long way in our ability to strike an enemy from a distance, and are making significant advances in the weapons area with the Maverick, Harpoon, and Harm missiles. The imaging infrared, or IIR Maverick, will enter the inventory in the mid-1980's and provide our FLIR-equipped attack aircraft, such as the A-6, A-7, and F/A-18, the ability to make low-altitude attacks against targets, day or night.

For hard kill of detection and fire control radar systems, we plan to introduce the high-speed antiradiation missile [Harm] on A-6, A-7, and F/A-18 aircraft.

All avenues are being pursued to reduce program cost. Second source proposals have been evaluated and the contractor selection is forthcoming. DSARC III is currently scheduled for March 21. Harm is urgently needed.

To further increase the flexibility and tactical versatility of our strike forces, we have integrated the Harpoon standoff missile system with the A-6 and P-3 aircraft and are considering future integration of S-3 and F/A-18. The combination of Maverick, Harm and Harpoon will significantly improve our standoff attack capabilities.

ANTI-AIR WARFARE

The second warfare area is anti-air warfare where the principal threat lies in Soviet cruise missiles which can be launched from submarines, surface combatants, and long-range bombers.

Those missiles are usually small, fast, and extremely difficult to locate, much less shoot down. Thus we stress killing the launch platform—be it a submarine, surface ship, or a Backfire prior to weapon launch.

The E-2C Hawkeye provides air surveillance for the battle group and control of fighter and attack aircraft in any ensuing engagements. The E-2C is the latest of the E-2 family of carrier-based, twin turboprop, airborne early warning [AEW] and control aircraft.

Another air~~craft in~~ our inventory which plays a major role in AAW is the EA-6B Prowler. It employs passive sensors to provide target warning, bearing, and identification. The importance of the EA-6B and its EW countermeasures can be testified to by any Navy pilot who has flown in hostile areas with intense radar and missile threats.

Currently, we only have enough EA-6B's to support 9 Navy squadrons of 4 aircraft each, and 1 Marine Corps squadron of 15 aircraft.

Trying to support all of our carriers has put an enormous burden on those nine Navy squadrons. Our plans include standing up a 10th squadron this July, but that unit will not be ready to deploy until June 1985.

We will achieve a 12-squadron force structure by fiscal year 1987, still 2 short for the 14 carrier air wings we anticipate in that time period.

Our overall objective is to achieve 14 Navy squadrons and, at the same time, provide for the similar needs of the Marine Corps.

A fourth generation EA-6B avionics suite [ICAP II] is presently being produced with improvements devoted primarily to the sophisticated jammer portion of the system. That will provide the most effective tactical electronic warfare aircraft in the world today, strengthening our ability to counter anticipated EW threats well into the 1990's.

Our main line of offense and defense in antiair warfare remains the F-14 Tomcat. The combination of its AWG-9 weapon system and Phoenix has established outstanding kill probability against targets ranging from fighter-sized maneuvering aircraft to air-to-surface missiles.

We have worked diligently to redress the readiness problems the F-14 experienced in the past and have succesfully increased readiness, and decreased unscheduled maintenance man-hours. Maintainability continues to improve providing further support for the fundamental strength of the Tomcat design. Major long-range improvements include the programmable signal processor [PSP] and radar/avionics upgrades.

However, the TF-30-414 engine in the F-14 remains a source of serious concern. We have recently completed a component improvement program which provides changes to improve the depot level rework interval and increase engine low-cycle fatigue life. We are continuing to monitor the U.S. Air Force competitive program for follow-on fighter engines, and will carefully review their findings.

Our F-14 support posture over the past several years was less than optimum largely because of funding limits. We have addressed some of the problems through the reprograming of funds into support items and expect significant improvement in material readiness for the next few years.

It is also important to remember that, although we still consider the Tomcat a new system, our initial production block aircraft are nearly 10 years old. We have updated those aircraft twice, each time resulting in improved readiness.

In force level considerations, the Navy plans to transition *Forrestal's* airwing to the F-14 in fiscal year 1985. The airwings embarked in the *Roosevelt* and subsequent carriers will be F-14 equipped as they enter service.

As our light attack squadrons transition to the F/A-18 strike fighter, they will be able to augment the F-14 in the air battle if threat levels dictate. The relative ease of pilot adaptation to the F/A-18's system operations is reinforcing our total confidence that our attack squadrons will be able to work either of the strike fighter roles at any given time.

MISSILE INVENTORY

Our air-to-air missile inventory reflects a mixture of short-range Sidewinder [AIM-9], medium range Sparrow [AIM-7], and long-range Phoenix [AIM-54] missiles, which will make up our inventory through the 1980's.

The AIM-9M is the latest version in the series of the Sidewinder infrared, guided, short-range, air-to-air missile and will be used on Navy and Marine Corps fighters and some light attack aircraft.

The current Sparrow, AIM/RIM-7M, is both an air- and surface-launched weapon. It is a semiactive, medium-range missile which is employed by Navy F-4, F-14, and F/A-18 aircraft and surface ships having the NATO Sea Sparrow system.

The 7M variant of the Sparrow missile incorporates a new target seeker which provides improved missile guidance performance.

A Sparrow follow-on, AMRAAM [advanced medium range air-to-air missile], is under development by the USAF to be introduced in the late 1980's and will significantly increase the F/A-18's AAW capability and enhance that of the F-14.

The Phoenix missile stands alone as the finest long range air-to-air missile in the world and can only be carried by the F-14. We have achieved an impressive success rate in Phoenix firings from Navy Tomcats.

The Phoenix is undergoing an improvement program to increase its capabilities during which changes are being made to the AIM-54A to produce the AIM-54C. Looking ahead, preliminary planning is already underway to develop a follow-on Phoenix-type missile capable of much higher speeds and ranges for the threat of the 1990's.

JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM

Joint tactical information distribution system [JTIDS] program continues to an integral part of our planned battle group improvements.

Several adjustments have been made within the scope of the program with which I am satisfied and of which you should be advised.

First, the E-2C is having JTIDS integrated into its planned avionics improvements rather than being tacked onto the present configuration.

Second, the F/A-18 vice the F-14 will be used as the principal Navy tactical aircraft for OPEVAL of initial JTIDS integration. The F/A-18 offers a lesser risk integration task because of its all digital system—JTIDS is a digital system.

Earlier integration into the F/A-18 also avoids approximately $30 million in procurement funds.

ANTISUBMARINE WARFARE

Antisubmarine warfare [ASW] referred to us is the third major warfare area for our carrier air wings. Airborne ASW will be discussed in hearings before the Seapower Subcommittee, so I will not dwell on it here.

I would like to say, however, that our R&D thrusts in ASW are toward more rapid detection, classification, and kill of the new Soviet submarines.

The final air elements of our carrier battle groups are support aircraft which contribute to the effectiveness of all warfare areas. They include carrier on board delivery [Cod] aircraft, the C-1, C-2 and US-3A; our tanker aircraft, the KA-6; the tactical air reconnaissance pod system [TARPS], and our special electronic reconnaissance aircraft, the EA-3B.

First, the COD aircraft are the lifeline of our deployed carriers. Our old, small, gasoline engined C-1's are being retired after a long and useful life and our current C-2 force is limited in number. To relieve that problem, we are reprocuring the C-2A in a multiyear procurement plan.

The procurement of additional CH-53E helicopters will add depth to our logistics effort in areas of the world such as the Mediterranean.

Our KA-6D tankers are vital to all warfare areas, but most especially in AAW and strike warfare. They can extend the time that F-14's can stay airborne for combat air patrol, extend the strike range of an F/A-18, A-7 or A-6, or service an aircraft that is low on fuel.

We are developing a new aerial refueling store which will further enhance our in-flight refueling capability and flexibility.

Reconnaissance is vital to the proper planning of any military operation and that capability is provided by the tactical airborne reconnaissance pod system, or TARPS, which is carried by F-14's assigned to carrier fighter squadrons. The TARPS is performing superbly in fleet use and has exceeded our expectations.

EA-3B

The final aircraft used in battle group operations is the EA-3B—which is a special electronic reconnaissance aircraft selectively operated abroad deployed carriers. Our limited number of EA-3B's will continue to operate into the mid-1980's, but their age makes them extremely hard to maintain. Replacement options are under study.

Although not an integral part of the carrier airwing, the land-based EP-3 aircraft plays a vital role in support of the battle group. The EP-3 incorporates electronic and communications intercept equipment needed to cope with the density and complexity of the electronic threat environment. We are procuring new airframes with upgraded sensor suites to retain this essential capability.

In the CNO's statement, he addressed the fact the basis for continued modernization of our forces lies in a healthy, ongoing R&D program. It is therefore incumbent upon us to insure that only those developments which provide the highest return in terms of readiness and combat capability are chosen.

With respect to advanced technology, the Navy is involved with the Army and Air Force in the development of an advanced vertical lift aircraft [JVX] to satisfy the Marines' requirement for a medium-weight class assault transport aircraft of the 1990's and the Navy combat SAR mission.

The Navy became the lead service last year and will continue toward the project's goal of building a common vehicle which all services can use in various mission roles.

The brief overview of naval aviation has summarized the effectiveness of our carrier battle groups, but has not included the tremendous contribution that U.S. Marine Corps aviation adds to the Navy's capabilities. I will defer to Lieutenant General Fitch to discuss his concerns and issues directly affecting Marine Corps aviation.

I would like to comment briefly on the issues of affordability and procurement programs. Our procurement strategy for naval aviation can be categorized as follows:

First, to extend and improve our current systems as much as possible through SLEP/CILOP;

Second, to strive for maximum commonality among new systems and subsystems for better procurement, support efficiencies, and operational flexibility; and

Third, to make maximum use of off-the-shelf systems.

Each year as we go through the detailed preparation to create the President's budget, we carefully review the aircraft we have in production, especially looking for areas in which costs can be reduced while still filling as many of our requirements as we can.

That close scrutiny includes examination of the number of aircraft production lines we have open and possible ways in which the number of lines can be reduced. Even though it is highly desirable to close a production line, the decision to do so boils down to how can the resultant inventory shortfalls be covered until a replacement system can be developed.

Hand in hand with our ongoing examination of procurement costs goes our assessment of the composition of our carrier airwings. A currently ongoing carrier airwing composition study has the objective of determining the optimum airwing mix for the 1990's.

The study, intentionally broad in scope, is using five projected operational environments with which to evaluate airwing requirements. The results of that study should be available sometime in late spring of this year.

In concluding, I believe that the individual aircraft that form our naval air forces are extremely capable and will hold their own against the threats imposed by any enemy. Our ongoing requirement for improved standoff capabilities, both air-to-air and air-to-surface, is evident in the face of the current and evolving threat.

I echo the CNO's words "we have begun to rebuild, however, we have a long way to go, but we do have a purpose, goals and a comprehensive plan to manage the resources you provide.

"We are a Navy on the mend, and with your support, we will reestablish the maritime superiority so vital to America's security."

We must sustain our efforts to provide the necessary cohesive links permitting carrier battle groups and naval aviation as a whole to retain their unchallengeable position on the seas of the world.

AIRCRAFT PROCUREMENT PROGRAMS

Mr. Chairman, with your permission, I would now like to go through a review of individual aircraft procurement programs. I will present each aircraft program cost information in the format requested by your staff.

Where appropriate, we will display program unit cost in constant fiscal year 1984 dollars for those programs documented by congressional selective acquisition reports or SARS.

For established programs no longer documented by SAR information, I will present procurement costs over the span of the program.

A-6 INTRUDER

I would like to present the A-6 Intruder. The Navy requests six aircraft for a total procurement cost of $232.3 million and includes $15.9 million for initial spares and $11 million advanced procurement for six aircraft in 1985. Flyaway unit cost is $23.9 million.

Senator **Goldwater**. Admiral, if you really need this aircraft, why are you only buying six a year for 5 years?

Admiral **Schoultz**. Right now our inventory is 302. We have a requirement for just about that same number. We are not going to have enough to fill our 13th and 14th airwings. We are keeping the line available to hopefully improve the weapon system.

We also need the A-6 airplane in competition with the F/A-18. We keep the line open additionally so that we have a mobilization surge and this airplane is still one of the cheapest attack aircraft that we have.

Senator GOLDWATER. I realize that. But, you are only buying six a year. That is a lot of money to keep one production line going. I know every time we suggest that you change that we bring the wrath of New York down on our shoulders. I know it is a fine airplane. For example, what would it cost to suspend production of A-6's and reopen the line 5 years later?

Admiral SCHOULTZ. Mr. Chairman, I can either ask some of these experts to respond to that or I can get it for the record.

Senator GOLDWATER. You may put it in the record. I know it will cost you money.

Admiral SCHOULTZ. Yes, sir.

Senator GOLDWATER. But I think you need other aircraft probably more than you need this one right now. I wish you would include only those costs directly related to closing the line and storing the production tooling and reopening the line 5 years from now.

As I have indicated to you, the fact that the Navy has 13 lines of production—it is really 16 lines—is a very difficult thing for us to sustain.

Admiral SCHOULTZ. Yes, sir.

Looking at the number of aircraft lines that are open, I agree with you it is a large number, but as we are expanding the forces with the 13th and 14th airwings I need the aircraft to continue to fill the requirements. Possibly some later date when we have all the requirements filled with the aircraft that are desired might be a better time.

We don't have the inventory. If we shut the line down as we build and expand the airwings, we won't have the aircraft to fill those requirements.

As I mentioned earlier, the airwing composition study is being looked at and we are not exactly sure of the balance of numbers and types of aircraft and it may show up that we require more of the A-6E's. That study will not be completed for some time. If that is true, if the line were shut down, it is difficult to fill that inventory. We have a problem if we shut down the line, as we did in the case of the S-3, we shut it down, and now as we are expanding the forces we need more S-3's and it is too expensive to open the line and start it again.

Senator GOLDWATER. I realize it is expensive, but it is also terribly expensive to keep a line open to manufacture six aircraft a year.

Admiral SCHOULTZ. Yes, sir.

Senator GOLDWATER. That makes Grumman happy, especially when you have others up there that are manufacturing about the same number. But it does not seem practical or wise to those of us who have to buy the equipment to see production at such a low ebb.

You may continue. We will talk about this more.

Admiral Schoultz. All right, sir. We will get those costs for the record on the shutdown.

[The information follows:]

A-6E Estimated Costs Shutting Down and Restoring Production Line

The estimated costs directly related to closing the A-6E production line and storing the production tooling and reopening the line 5 years later is as follows:

[In millions of dollars]

	1984	1985	1986	1987	1988	Total
Line close down	14.3	5.5				19.8
CFE restart				9	21	30.0
GFE restart				10	20	30.0
Total	14.3	5.5		19	41	79.8

(1) The close down funds are required to close down the GFE and CFE production lines. Included, in addition to contract close out costs, are such actions as the cataloging, preserving, packaging and moving to storage all government owned tools and equipments.

(2) The GFE restart costs are required due to loss of learning and the fact the many of the old GFE equipment will no longer be produceable.

(3) It should be noted that support funds in the amount of $375.0M over the five year are required to make an orderly transition from production status to in-house Navy support, and to provide for essential logistics support and procurement of required spares during the five-year period.

(4) Sustaining engineering funds in the amount of $104M over the five years are required to provide the necessary personnel to solve fleet problems and are normally associated with the production contract. If funds are not provided, these labor, engineering and production line costs will have to be assumed by the modification program, thereby increasing costs or decreasing the scope of the A-6 modification program.

EA-6B PROWLER

Admiral Schoultz. The second aircraft is the EA-6B Prowler. I think this is really the finest EW aircraft in the world. The 1984 request at a procurement cost of $442.3 million includes $42.7 million for initial spares, $17.6 million for advanced procurement of six aircraft in fiscal year 1985. Flyaway unit cost for this aircraft is $34.2 million.

Senator Goldwater. Actually you have only enough of these aircraft for about nine airwings?

Admiral Schoultz. Yes, sir.

Senator Goldwater. So you need three more squadrons?

Admiral Schoultz. Yes, sir.

Senator Goldwater. And you are buying six a year?

Admiral Schoultz. Yes, sir. There are four per squadron. We hope to have 12 squadrons as I mentioned in the statement by 1987, but we have the need for 14 for the airwings. It will take us some time to get there.

Senator Goldwater. Members of the subcommittee can ask any questions they want.

Senator Bingaman. Let me ask, Mr. Chairman, how quickly do you lose planes out of an inventory, say this particular plane? Do you lose some through accidents and other things?

Admiral SCHOULTZ. Yes, sir. Normally an attrition rate is computed at about 4 percent of the inventory and then, of course, they have a life cycle which varies with every aircraft.

Senator BINGAMAN. What is the inventory of these planes?

Admiral SCHOULTZ. We have currently an inventory of 63.

Senator BINGAMAN. And the current inventory of the A-6E was what?

Admiral SCHOULTZ. Roughly 310, sir.

Senator BINGAMAN. 310?

Admiral SCHOULTZ. Yes, sir.

Senator BINGAMAN. So that if you are losing 4 percent of the A-6E's each year through attrition, that means you are losing 12 of them a year?

Admiral SCHOULTZ. No, sir.

Senator BINGAMAN. So you are losing more than you are acquiring, is that a fair statement?

Admiral SCHOULTZ. Well, that is the prediction. Hopefully we won't do that, sir.

Senator BINGAMAN. If you have a 4-percent attrition out of 300 planes, I am not much of a mathematician, but 1 percent of 300 is 3, 4 percent ought to be 12. So you have 12 planes you are losing each year and you are buying 6. I am confused.

Admiral SCHOULTZ. I think you have it right. I said that. Let me check the predicted attrition on the A-6 aircraft which is what we are addressing right now.

As I remember, the attrition rate of the A-6E, because it has been around for some time, has come closer to 3 percent, but still the point you make is well taken.

Senator BINGAMAN. I just raised that, Mr. Chairman. I think it supports the point you are making that if we are adding six a year and even at that we are seeing a reduction in our inventory of each of these types of airplanes, it does raise a real question as to the rate at which they ought to be produced or the line shutdown.

A-6

Admiral SCHOULTZ. In the A-6, while we are discussing the aircraft, we have a STOL demonstrator that has been funded that has currently completed some of the wind tunnel tests and will continue further tests. Hopefully we will be able to fly that in a year or two which may make a modification of this aircraft in the future.

Back to the EA-6B, the Senator brought up the attrition. I don't have the numbers right here. I can get that for you. Attrition in the EA-6B has been higher than we predicted for this aircraft.

Senator BINGAMAN. Let me ask if there is such a thing as an inactive storage? Is there a category like that that you include in the inventory?

I wonder if the inventory of 310 A-6E's means you have 310 planes that you are using and are flying or is there such a thing as inactive storage and a certain number of those are in inactive storage?

Admiral SCHOULTZ. Inventory includes pipeline, which is those that are in repair, includes those in training and those in the active squadrons.

Whether there is an inactive list added to that, I am not sure, Senator. I can get that for you.

Senator **Bingaman**. I would appreciate that.

Admiral **Schoultz**. One of the experts just handed me the predicted A-6E attrition rate which is 2.6 percent. It varies from aircraft to aircraft and 4 percent is sort of an average, but this airplane has been around for 20 years and they finally decided they have a good number on it. So that is 2.6 percent.

Your point is well taken, 3 percent of 300.

Senator **Bingaman**. That is all I have, Mr. Chairman.

Senator **Goldwater**. This aircraft is now costing you $26 million?

Admiral **Schoultz**. On the A-6E, Mr. Chairman?

Senator **Goldwater**. Yes.

Admiral **Schoultz**. I have learned a lot about cost figures. I find you can figure those things every way imagineable. The numbers that I have are the SAR comparisons for those aircraft and various people have different ways of figuring costs. I am not sure mine is exactly comparable.

Senator **Goldwater**. Admiral Seymour?

Admiral **Seymour**. On the EA-6 the interesting thing is the basic flyaway cost of the airplane is $26.4 million. On each airplane, it carries five PODS that contains jammers. So in this particular airplane, EA-6B, the cost of PODS and transmitters is over $6 million per airplane. They can be moved off that airplane and put on another one.

When you lose an airplane, you generally lose all the PODS with it. So for budget purposes, flyaway costs is $34.2 million.

Senator **Goldwater**. We get an opinion of $66.6 million.

Admiral **Seymour**. The $66.6 million is the gross P-1 cost sheet which includes flyaway and support.

Senator **Goldwater**. You want the weapon. If you just bought the fuselage and engine, it would be different. We are buying the whole ball of wax.

Another reason that the price is so high, you are only buying six. We talked last year about that. If this airplane is so valuable, either cut down on the number of F/A-18's you want or F-14's and buy more of these or cut down on these and buy more of the others. It is a pretty old airplane.

Admiral **Schoultz**. Every year, Mr. Chairman, we do a balancing act trying to make the inventory do the best we can and consult around within the Department.

Senator **Goldwater**. I know it is not an easy problem. Every military department is faced with this problem. They get married to certain pieces of equipment and they don't like to turn loose.

I think you flew this rascal 10 years ago. It was an old airplane then. If I am not mistaken, I think this aircraft went through the early days of Vietnam and never had a carrier accident, which speaks very well for it.

I think we have reached the day when the Navy has to pretty much fish and cut bait. Either you are going to have less modern aircraft or you are going to continue to buy these at the expense of modern aircraft.

That is a question entirely for us to get in our mind. Six airplanes a year is one every 2 months. You can make them in your garage at that speed. That is something for you to think about.

Admiral SCHOULTZ. Yes, sir, I understand.

Senator GOLDWATER. We are facing on the floor of the Senate this year a very, very hostile Congress. They are bound and determined to cut this budget. This is one area they are going to bang at us and it is a hard area for us to stand up and defend.

Admiral SCHOULTZ. I want to mention again, Mr. Chairman, that we have that evaluation ongoing now on board the *Kennedy* with the F-14/A-6 airwing. Should that come about that we need more of the A-6E's and we close down the line, it will be hard to start that again. You pointed out all the problems.

Other than a mobilization capability to provide some competition for the other attack aircraft and actually we have the price down pretty well with them, they are pushing for a multiyear contract, of course, but I just need the airplane to increase the inventory.

Senator GOLDWATER. You can be sure you haven't heard the last of it.

Admiral SCHOULTZ. I understand that.

Senator GOLDWATER. We will do our best to defend you in all probability.

Admiral SCHOULTZ. I understand, sir.

Do you want to proceed to the next one, Mr. Chairman?

Senator GOLDWATER. Yes.

AV-8B HARRIER

Admiral SCHOULTZ. The AV-8B Harrier. We request 32 aircraft for a total procurement cost of $1,047,600,000. This includes $139 million for initial spares, $98 million for advanced procurement of 48 aircraft in 1985. Flyway unit cost is $20.1 million.

Out of this 32 aircraft there will be two TAV-8B's that General Fitch will probably discuss later. It is a trainer and makes a lot of sense to us to buy a trainer for this version of the AV-8—we have a few of the old AV-8 trainers, but the airplane does not fly the same, does not respond the same, you can't train somebody on a bicycle to ride a motorcycle.

Senator GOLDWATER. What is the cost of the trainer compared to a single seat?

General FITCH. The difference in price, Mr. Chairman, is approximately $1 million.

Senator GOLDWATER. How much?

General FITCH. Approximately $1 million more.

Senator GOLDWATER. Just one with a single seat?

General FITCH. Yes, sir. Now, there are some other equipments that would be in the AV-8B which because of the trainer mission would not be required, such as ECM equipment.

Senator GOLDWATER. You had the highest accident rate in the Marines and Navy in the A. You have made some changes in time requirements for pilot upgrade to the A that has lowered your accident rate, has it not?

General **Fitch**. Yes, sir, our mishap rate has been lowered. Our worst year was in 1977 and we did make some significant changes after that. We lost five airplanes last year.

Senator **Goldwater**. A million dollars a bird is not too unreasonable. For example, what was your accident rate last year?

General **Fitch**. It was five aircraft that were lost. These are major mishaps. I believe the percentage was approximately 37.0; 40.5 was the actual rate for five mishaps.

Senator **Goldwater**. It was up to 70?

General **Fitch**. It has been almost that high back in the 1977 timeframe, yes, sir.

Senator **Goldwater**. What are your pilot requirements now to get into the A?

General **Fitch**. We are, of course, selecting pilots from the upper percentage of the graduates from flight training, that we refer to as nuggets. We are also taking previously trained attack pilots from our A-4M squadrons and transitioning them to the AV-8.

When we get the AV-8B, we will transition all of our A-4M squadrons over a period of about 7 years into the AV-8B.

Senator **Goldwater**. The OPEVAL report was critical of the AV-8B speed and acceleration?

General **Fitch**. Yes, sir.

Senator **Goldwater**. Do you want to comment on that?

General **Fitch**. That is referred to, Mr. Chairman, as specific excess power and the aircraft does have a shortfall in that specific area.

We don't have the production engine in the full-scale development aircraft. The engine in the full-scale development aircraft is the F402 Rolls Royce-404. The engine that will be in the production aircraft beginning about a year and a half from now will be the Rolls Royce F402-406.

That engine will have approximately 1,200 pounds more thrust than the current operating engine. That will solve part of the problem.

The other part of the problem is drag reduction which McDonnell is working on.

Senator **Goldwater**. Have you found by putting more experienced pilots in the A your accident rate went down?

General **Fitch**. Yes, sir; that is correct.

We also have a lot more command supervision and have added more two-seat trainer flights, which has also been a factor. We had a problem with the AV-8A in that we did not introduce the two-seat airplane until quite late in the program, about 1976.

Senator **Goldwater**. We question the need for a trainer, but I realize this aircraft is different. It is still going to be a highly critical aircraft at lift-off and touch-down. The compressor stall, for example, of almost a millisecond can bring about a crash and no pilot is going to be able to correct that.

General **Fitch**. Mr. Chairman, with the AV-8B, we have reduced the pilot workload by a factor of about 65 percent when compared to the AV-8A. The AV-8A is a very high workload aircraft.

It is also very unforgiving of human error, so that the pilot does have to pay very close attention to what he is doing. But by reducing the workload of the aircraft, primarily in the V/STOL mode, we would expect a significant reduction in the number of mishaps in this type of aircraft. We would project that the AV-8B mishap rate, when introduced, will be comparable to other aircraft such as F-18's, A-6E's, F-14's and so forth.

Senator **Goldwater**. Thank you.

Are there any further questions?

Senator **Bingaman**. Your earlier statement was that the five accidents last year amounted to a 37-percent accident rate, is that right?

General **Fitch**. Yes, sir. What we have, Senator, is a very small community of aircraft. We have three tactical squadrons. Mishaps are calculated based on 100,000 flight hours. One mishap in the AV-8, because of the small community, you have an 8.2-mishap rate.

If you lose another aircraft, you go to 16, and so forth. In other aircraft, because of large numbers and attendant-high flight hours, this is not the case.

Senator **Bingaman**. But in 1 year we had 37 percent of the aircraft that have had accidents.

General **Fitch**. No, sir; that is 37 mishaps per 100,000 flight hours.

HARRIER IN FALKLAND ACTION

Senator **Bingaman**. I read something in the paper at the time the Falkland thing was going on about the Harrier.

What was the experience with that aircraft during the Falkland war?

General **Fitch**. The Royal Navy with the Sea Harrier was very successful primarily in an air intercept role. The aircraft is generally credited with shooting down approximately 20 Argentine aircraft. These intercepts were conducted at various altitudes, but most of them were pretty close to the water. The Royal Air Force also had some aircraft involved and those aircraft were primarily utilized in the ground attack role.

The Royal Air Force did not, to my knowledge, have any air-to-air kills of Argentine aircraft.

Senator **Bingaman**. But to your knowledge, there were no problems with the Harrier during the Falkland encounter?

General **Fitch**. They lost, I believe, five aircraft which were destroyed by enemy ground fire. None were destroyed by air-to-air weapons. Five additional aircraft were lost due to some type of accidents.

Senator **Bingaman**. Maybe you have covered this, but it seems that this aircraft as presently constituted is quite accident prone. Is that a fair statement?

General **Fitch**. As regards the AV-8A the accident rate has been much, much higher than we would ever have hoped to sustain, however, that is an aircraft designed about 20 years ago. In the AV-8B we have designed out those shortcomings.

Senator **Bingaman**. That is the one that had the five planes lost last year?

General **Fitch**. AV-8A.

Senator **Bingaman**. The AV-8A?

General **Fitch**. Yes, sir.

Senator **Bingaman**. You don't anticipate those accident problems with the AV-8B and that is what you are proposing to buy?

General **Fitch**. That is correct, sir. We are going to buy the AV-8B. This will be your second generation of a high performance V/STOL aircraft.

Senator **Bingaman**. Thank you, Mr. Chairman.

Senator **Goldwater**. Senator Wilson?

Senator **Wilson**. No questions, Mr. Chairman.

I would just like to say hello to an old friend, Mr. Chairman, having been the mayor of San Diego. I am glad to see Admiral Schoultz now and Admiral Gillcrest.

F-14 TOMCAT

Admiral **Schoultz**. I would like to proceed with the F-14 Tomcat, Mr. Chairman.

The request includes 24 aircraft for a total procurement cost of $1,149 million. This includes $84.3 million for initial spares, $178.8 million advance procurement for 24 aircraft in 1985. The flyaway unit cost is $37.6 million. We are planning an upgrade on this aircraft in fiscal year 1984 with the program signal process or which I mentioned and in 1987 including the new engine and hopefully in 1989 or 1990 the avionics upgrade.

We have a total of 394 in the inventory.

Senator **Goldwater**. How are you fixed for your new carriers?

Admiral **Schoultz**. Sir?

Senator **Goldwater**. How are you fixed to equip your new carriers?

Admiral **Schoultz**. They are going to be F-14 equipped. The program will fill all those requirements.

Senator **Goldwater**. It will?

Admiral **Schoultz**. Yes, sir.

Senator **Goldwater**. All right.

Admiral **Schoultz**. As I mentioned, we hope to upgrade the weapon system in this aircraft. We made the basic decision to retain the F-14 and A-6 as our basic aircraft and upgrade them rather than to buy a new type of aircraft.

F/A-18 HORNET

The next aircraft, F/A-18 Hornet. That cost figure you see, the cost growth figure in the right-hand column, is a comparison of the SAR program cost. When the Secretary briefed the aircraft cost he compared the unit flyaway cost over the period.

His growth figures and ours come out about 20 percent using that comparison. This is just a comparison of the SARS. There again I find out there are many ways to compute growth in costs. We have some other alternatives and we have all the experts on figures here if you would like to discuss them.

Senator **Goldwater**. The criticism of this airplane which you and I have discussed is its range in an attack mode?

Admiral **Schoultz**. Yes, sir.

Senator **Goldwater**. You say it has a 400-odd miles radius?

Admiral **Schoultz**. Yes, sir.

Senator Goldwater. You want to extend that. How many pounds of fuel are you going to have to add in outside tanks to make it perform up to what you want it to do in an attack mode?

Admiral Schoultz. Mr. Chairman, actually I think it will perform the way we want it to the way it is with the tanks we have now. We have looked at the 460-gallon tank and putting two of those on will give you another 50 or 55 miles worth of range, but those tanks are expensive. We have not decided to do that as yet.

We have looked at possibly including the additional fuel inside the aircraft. They could put a central tank in it, but it gives them weight and balance problems.

Also, it is darn expensive because you have to go back into an R&D program to refly the airplane. Frankly, the Navy, as the operator, has never been unhappy with the range. We wrote specs. It didn't meet the specs, the Opeval people made a big issue of that.

As I say, it is my contention that if you build an airplane and build in the maintainability, reliability, survivability, and flexibility, the easiest thing to change is range. You just plug it into a tanker and it will go further. You can fly around the world with enough tankers.

When you talk range everybody says how much is enough. We really don't have a number. We wrote a spec for 550 miles in one configuration and it actually flew that if you use a different set of computations. We are finding now in the replacement squadrons that are flying the airplane with two tanks, the other day with four MK-82's, replacement pilots flew that plane over 440 miles on a high-low-low-high profile.

So, I think from an operator's standpoint the range as it is in the Strike fighter is adequate.

Senator Goldwater. You really don't believe that, do you?

Admiral Schoultz. Yes, sir. I would like to have more, let me say that. But it is adequate and it will do the job.

Senator Goldwater. The 440 is a good long range, but you know there are going to be tactical situations at sea when the enemy is going to be further than 440 miles.

Admiral Schoultz. Yes, sir. Then we will need more tanking.

Senator Goldwater. You have to tank routinely?

Admiral Schoultz. Yes, sir.

Senator Goldwater. I see every 100 gallons of JP-4 you hang on that tank you are apt to lose a 500-pound bomb.

Admiral Schoultz. That flight I just mentioned to you that they flew with people from the replacement squadrons, it took them over 2 hours to fly that mission. We think we have learned to use the aircraft. We are learning to find the optimum profile to fly to get the best fuel consumption. In the Opeval the people around the ship use full flaps because that is what was written into the Natops. Then we started flying with the people from the replacement squadron. They found out they could use half flaps in the pattern and save about 200 pounds a pass.

Senator Goldwater. That is in the pattern?

Admiral Schoultz. Yes, sir.

Senator Goldwater. That is not on take-off?

Admiral Schoultz. No, sir. That is just an example. As we start using the airplane and refining the profiles and the best way to do it, I think we will find the airplane will do everything we want it to do.

Senator **Goldwater**. I have heard about that. If you get back from the enemy target close enough to see the carrier, you have it pretty much made?

Admiral **Schoultz**. Yes, sir. If you have a tanker available.

Senator **Goldwater**. You don't need to argue about flaps or no flaps. You will have to hold. This is something we will watch. Keep us posted. I know that nobody is really happy with the attack mode.

In the fighter mode I think they are more and more accepting it. Are you running more evaluation tests on the tactical now?

Admiral **Schoultz**. Yes, sir; they are continuing to do that. With the introduction into the Marine squadrons the replacement pilots out of the training command are getting their first bombing experience, the average CEP is 57 feet. These are brand new pilots. They are very happy with the airplane. We have over 9,000 hours of training time with this aircraft and we haven't had an accident in the training environment.

Also, we are finding that our maintenance hours per flight-hour are around 18 to 20. Comparing that with some of the other aircraft which are some 60 maintenance manhours per flight-hour that is a tremendous savings.

Senator **Goldwater**. I am not arguing that. There is no question that the Navy pilot or Marine pilot can hit the target with a good CEP. It is getting the damn thing there. It doesn't do any good to land 20 miles short.

E/A-18 EJECTION SEAT

Just one other point on the whole F/A-18. You had a little hassle about the ejection seat?

Admiral **Schoultz**. Yes, sir.

Senator **Goldwater**. Somebody in the House wrote it in that you couldn't buy any aircraft advanced procurement that didn't have ejection seats made in the United States. That is a bother to you, isn't it?

Admiral **Schoultz**. Yes, sir; they are going to have to be competed. We proposed to the Appropriations Committee a plan. There are some prime contractors, Douglas, Stencil, of course, and one other, Webb, and, of course, as Chairman Tower wrote the Secretary, we will include in the competition the Martin Baker seat. So you will have competition among four of them.

The problem is that once the competition is completed, and there will be competition on cost-plus performance, we will really have a requirement to retrofit that aircraft. When you jump in an F-18, you need to know how to get out of it and it should not be different from one plane to another because that would be hazardous; 1986 is the soonest we can get them into the airplane. The seat will be competed.

Could I have the program manager, Commodore Weaver, speak on that subject?

Commodore **Weaver**. At the present time we are formulating that final specification for competition and request for money to do the developmental effort for the new seat plus production incorporation in the F/A-18. We estimate the development effort will cost somewhere between $18 and $22 million and the production incorporation another $6 million.

Then as a function of how rapidly we accomplish that progress, to determine the retrofit bill which will run $15 to $20 million over that. This request for additional funds is in the process at the present time.

Senator GOLDWATER. I intend to try to get language in the Senate bill that will change that. This is a bad mistake. We are not going to even wind up with an ejection seat.

Admiral SCHOULTZ. It was originally competed. To go back and do it again will cost us a lot of money.

Senator GOLDWATER. We will do what we can for you, but I wouldn't bet on it.

Admiral SCHOULTZ. Thank you, Mr. Chairman.

Is there anything else you would like to discuss?

Senator BINGAMAN. I want to ask about the cost of it. I have a note here that there has been a very substantial increase in the program cost over what was originally estimated, something over 100-percent increase in the program cost.

I wanted to ask if you would comment on whether that has occurred and why.

Admiral SCHOULTZ. All the costing stuff took place before I got here.

Senator BINGAMAN. All of this took place before I got here.

Admiral SCHOULTZ. Senator, 100 percent is wrong. I can find a variety of numbers ranging from the comparative SAR numbers which I had on the slide of 4 percent to the Secretary's testimony that said it is around 20 percent. There is also a new system that we just started on Thursday with an OSD accounting method which some of your staff people have used.

I think I have a slide on that which will show 27 percent. We started with an 812 airplane buy and we increased the program to 1,377. Also, of course, inflation was about 80 percent of that if you look at the total cost, because the program started at about $12 billion and now it is $39 billion.

We increased the numbers and inflation stated in 1975 dollars.

Senator BINGAMAN. The information I have is that the original estimate of the program cost when the F/A-18 entered development was something, whatever the figure was, it has increased from that figure to about $39.8 billion now which is over 102 percent increase in the program cost over what was originally estimated.

Is that accurate?

Admiral SCHOULTZ. Can I let the program manager address that, sir?

Commodore WEAVER. The initial estimate as you stated, is correct. When we see the projection of inflation on the program extended out into the 1992 time frame, the compounding effect of inflation on base price runs around 78 percent. You add the 22 percent the Admiral spoke of as flyaway cost and program cost, you see 102 percent (adjusted for quantity) due to the 1975 base year dollars versus inflated dollars, the primary effect of inflation over that period of time.

There has been some slippage. The program's original concept was to complete the buy in 1988. Now it is 1991. That further compounds the inflation over those additional years. In base year 1975 dollars using the additional 566 aircraft that were procured we see only the 4-percent increase in cost.

When you look at flyaway you see a 20-percent increase in cost. When we take out and subtract from that flyaway increase in cost the increase in aircraft that we procured, additional 566 aircraft over the base estimate, we see another 7 percent or 27 percent increase in cost for flyaway of the aircraft.

Senator **BINGAMAN**. In short, you don't think there is any sort of unreasonable increase in the cost of this program?

Commodore **WEAVER**. We feel with the SARS and other programs our program has stayed reasonably stable, particularly in the last 3 years.

Senator **BINGAMAN**. Let me ask also about the program size.

How many of these are you asking to buy?

Admiral **SCHOULTZ**. Eighty-four.

Senator **BINGAMAN**. Do you have an estimate as to how many of these would be required to provide sufficient aircraft to meet the need of the Marines?

As I understand, that is the main purpose of these; is that right?

Admiral **SCHOULTZ**. The first three squadrons to stand up will be Marine squadrons and then we will shift to Navy.

Senator **BINGAMAN**. Do you know what we are looking at as far as total numbers of aircraft that are needed?

General **FITCH**. I can give you our estimate, Senator. We estimate for the life of the program, taking care of 12 fighter squadrons, our tactical air coordinator airborne mission, reconnaissance and also training squadrons plus our reserves pipeline and attrition, to total out to approximately 476 aircraft.

Senator **BINGAMAN**. 476?

General **FITCH**. Yes, sir, over the life of the program.

Senator **BINGAMAN**. That will be adequate for your needs as you see them?

General **FITCH**. Yes, sir.

Senator **BINGAMAN**. That is built into this program?

Admiral **SCHOULTZ**. Yes, sir. It is built into the 1,377 total.

Senator **BINGAMAN**. That is all I have, Mr. Chairman.

Senator **GOLDWATER**. Senator Levin?

Senator **LEVIN**. Thank you, Mr. Chairman.

F/A-18 SPECIFICATIONS

What specifications for the F/A-18 has the plane not yet met, Admiral?

Admiral **SCHOULTZ**. Two primarily. One is the weight. It is still slightly overweight, about 800 to 900 pounds.

Rather than give you these detailed figures, do you mind if I ask the program manager to answer that?

Senator **LEVIN**. That is OK.

What are the other areas?

Admiral SCHOULTZ. Approach speed. It is 2 knots, 134 versus 132 coming aboard.

Senator LEVIN. Is there some problem with the tactical ability? Is it less than originally planned for?

Admiral SCHOULTZ. As we discussed with the Chairman earlier, we wrote a specification for a particular profile with a particular range that it did not make in that profile.

As I mentioned before, I believe the range is adequate.

Senator LEVIN. What was the range that it was supposed to have?

Commodore WEAVER. The original specification requirement was for 614 nautical miles against a specific set of ground rules. These ground rules were standardized. You flew on a standard day, flew a very specific profile, it was a high-low—low-high mission with lots of maneuvers in the target area. We did not see the airplane achieve that specific performance which we had in the contract. We had a DCP requirement, with OSD. That number in that decision coordinating paper is 550 nautical miles.

As the Admiral indicated, in a coordinated mission when we see fighters coming in against us, 450 miles.

Sentor LEVIN. The original design specification was 618?

Commodore WEAVER. 618. Yes, sir.

Sentor LEVIN. Now it is where? Is it 550?

Commodore WEAVER. That original specification had FLIR and laser spot tracker on it. Our engineers estimated it would go 525 miles aginst that specific profile.

Senator LEVIN. Have we reduced the specification?

Commodore WEAVER. Yes, sir, we tend to reduce specs as we fund subsequent lots of airplanes so that we don't have to pay to achieve that additional performance.

Senator LEVIN. Was that initial performance an exaggeration of the need? Are we going to accept 525 performance instead of 614?

Commodore WEAVER. Yes, sir. The question was whether we want to put more money into the airplane to try to acquire the additional nautical miles. The decision has been made we will not.

Senator LEVIN. Who pays for the failure to meet that specification?

Commodore WEAVER. The Government pays for it on a cost-sharing basis on an R&D contract, 80 percent by the Government, 20 percent by the manufacturer once he has achieved the target.

Senator LEVIN. This is not in procurement?

Commodore WEAVER. We are in procurement. We buy each subsequent lot year against the performance capability that we have demonstrated in the development program.

Senator LEVIN. What kind of contract do you now have with them?

Commodore WEAVER. We have a firm fixed price in 1982. We transition from cost-plus incentive fee to fixed-price incentive. In 1982 we have a fixed price contract. We project we will have the same type of contract in the future. The engine contract is a fixed price contract with General Electric.

In our 1981 contract they actually underran the target cost on the contract.

Senator **Levin**. Are we going to have to use more tankers because the range is less than we originally intended?

Admiral **Schoultz**. Depending on what the strike is, we may have to use more tankers.

Senator **Levin**. Are we buying and converting those tankers?

Admiral **Schoultz**. We are converting 48 A-6E's into KA-6's. That is in the FYDP. That is a 5-year defense plan.

Senator **Levin**. Is there money in here for that?

Admiral **Schoultz**. Yes, sir.

Senator **Levin**. How much money is in here for the conversion of those tankers which result from the inability of the F/A-18 to meet its original specification?

KA-6 TANKER CONVERSION

Admiral **Schoultz**. The KA-6 tanker conversion was started some time ago. I don't know that I can specify which ones will be used for the F/A-18. I can give you the cost of what the KA-6 conversion was. It started—I can't grab it right away.

Can I come back with that, sir?

Senator **Levin**. If you can supply it for the record and break out what portion of that cost is a result of the F/A-18 not meeting its original specs, that would be helpful.

Admiral **Schoultz**. I will try.

Admiral **Seymour**. None of that is, sir. They were in the FYDP prior to the OPEVAL of the F/A-18. Forty-eight KA-6D's are still in the program. The cost this year is $16.98 million.

Senator **Levin**. There is no additional tanker capability that will be required because this plane is going to need additional tankers?

Admiral **Seymour**. No, sir.

Admiral **Schoultz**. As I mentioned to the chairman, we have looked at additional tanks. Whether that is a viable option, we have not decided yet. Tanks are expensive. As I said, we are learning more about the airplane as we are using it.

Senator **Levin**. If you need more tankers to refuel this, its range is less, how can we not say we have to either purchase or refit planes to be tankers for this plane?

I don't understand the logic of the conclusion.

Admiral **Schoultz**. You are saying it needs a specific range. The problem maybe lies back in the particular initial specification drawn up.

Was that a viable range?

Senator **Levin**. The 614?

Admiral **Schoultz**. Yes, sir.

Senator **Levin**. Was it?

Admiral **Schoultz**. In my view, no. In a cycle ops situation you can't go that far. Range is a very difficult thing. What is enough? How much is too much? Our A-6 will go about that same range depending on the profile. If you fly high-high-high all the way and drop a MK-82 bomb it will go 900 miles. In Vietnam the average strike was between 270 and 285 miles.

Senator **Levin**. You have reached a conclusion that the 614 figure was too high, that we set our sights too high originally?

Admiral SCHOULTZ. I think you need to do that in a specification, Senator. You need to set it as high as you possibly can and make them strain for it. Maybe they can make it.

Senator LEVIN. When they got the contract on this did they indicate they could make it?

Admiral SCHOULTZ. They must have thought they could or they wouldn't have taken it.

Commodore WEAVER. Yes, sir. As I indicated, there is a coordinating paper, the Navy's contract with DOD which meets our projected operational requirement. The Naval Air Systems Command makes the contract with the contractor. We attempt to usually specify the number of areas slightly higher than our contract with DCP.

We then traded off on a balance, that performance against other things we can do in the airplane. For example, we could have easily made the range by not doing some operational maintainability, reliability and commonality features in the airplane that make it slightly heavier.

When the operator was seeing this range for over a period of 3 years, we recognized he does not need more than 550, we did not see the need of forcing the issue and paying the costs.

Senator LEVIN. We are still short on weight and speed in terms of meeting specs?

Admiral SCHOULTZ. Yes, sir.

Senator LEVIN. Have those specs been modified, too?

Admiral SCHOULTZ. No, sir. They have not. We have a weight reduction program that we are working on. I don't know whether the approach speed is going to be fixable or not.

Senator LEVIN. Who is going to pay the price of meeting those specs if they are not changed yet? Will the contractor have to pay the price of meeting those specs or are we?

Admiral SCHOULTZ. It seems like it is real simple, it should have a straightforward answer. But when I asked the question, it got very complex.

Commodore WEAVER. The development program is an 80-20, Government sharing 80 percent, contractor 20 percent. We have exceeded target at this point. We do have a weight reduction program which has been paid for and it is being inserted now in the production line which will reduce weight approximately 400 pounds.

With all our aircraft we see a year-by-year additional capability. JTIDS will add a slight amount of weight to the aircraft. We use a weight reduction program to offset an increase in weight. We do not see any change in approach speed going from 134 down to 132, but we feel it is adequate.

Our OPEVAL pilot had a boarding rate of 92 percent our replacement squadron pilots are boarding at a rate of 100 percent.

Senator LEVIN. Was the 134 part of the original design and the contractor said they could meet it?

Commodore WEAVER. There we had 128. We are now accepting 134. Our criteria for operational performance is 132.

Senator LEVIN. The contractor said originally they could meet the 132 spec?

Commodore WEAVER. Yes, sir.

Senator **Levin**. We basically have worked out an arrangement with them and we still accept something less?

Commodore **Weaver**. We stopped paying them any more money to improve that performance.

Senator **Levin**. There were some reports last year that the Navy had conducted some studies comparing moderization programs with and without continued procurement of the F/A-18.

Were those studies made?

Admiral **Schoultz**. I don't know that. Maybe I can get that for the record, Senator.

Senator **Levin**. Would you supply that for the record?

Admiral **Schoultz**. Yes, sir.

Senator **Levin**. Thank you.

[The information follows:]

Procurement Studies

Various alternative modernization programs were considered which examined alternatives to continued procurement of the F/A-18. The result of this assessment indicated that no alternative procurement program offered significant cost advantage over the F/A-18, and no alternative procurement program would generate a TACAIR inventory which would have been as operationally effective as one which included the F/A-18.

Senator **Bingaman**. Mr. Chairman, I want to ask, there are so many of these aircraft it is difficult for me to get any idea of their relative cost.

VARIOUS AIRCRAFT PER UNIT COST

Would it be possible to get a figure on the per unit cost of the F/A-18, the F-15, F-16, and the F-14 and also the improved version of the F-14?

I gather you have an improved version of the F-14?

Admiral **Schoultz**. The F-14, we don't have it yet. We are planning to improve it.

Senator **Bingaman**. It is the F-14B, is that right?

Admiral **Schoultz**. Yes, sir. If you are talking of flyaway cost. Flyaway cost includes the basic airplane, the airframe and the contractor-furnished equipment, the change allowances allow the program manager to make certain changes in it, the engines, engine accessories, electronics, armament, other Government-furnished equipment, and nonrecurring costs and mission-essential equipment, all of that goes into the so-called flyaway cost of the airplane.

We have computed that for all the different airplanes. As as example, for the AV-8B it is $20.1 million. F/A-18, it is $21.2. The EA-6B is $34.2. The A-6 is $23.9. P-3, for example, is $33. That is an ASW airplane. The helicopter CH-53, $17.1.

Senator **Bingaman**. You don't have a figure for the F-14?

Admiral **Schoultz**. Yes; the F-14 is $37.6.

Senator **Bingaman**. You don't have a figure for the F-14D?

Admiral **Schoultz**. No, sir, we do not.

Senator **Bingaman**. When will you be able to give us that?

Admiral **Schoultz**. I don't know what the F-14D really is going to be yet. We are going to do several things. We are going to put the program signal processor hopefully in the 1984 airplanes and in 1987 upgrade the engine. That is a block upgrade. Then in 1989 or 1990 upgrade the avionics.

When that gets done it will be a D or we can change it to a D when we put the engines in which might be the right way to go in 1987.

We don't have a program firmly approved on how we are going to do that.

A-7 COSTS

Senator **Bingaman**. Also if you have figures on the cost of the A-7. I don't know that you are buying any of those, but the Air National Guard uses those, as I understand it.

Admiral **Schoultz**. Yes, sir.

Senator **Bingaman**. Do you have a cost figure on those?

Admiral **Schoultz**. All we have are the budget numbers for this year. We will get that for you.

Senator **Bingaman**. I would be interested in the A-7. Could I get the information to be able to compare cost, range, and weight with some of the other planes that we are proposing to buy this year?

Admiral **Schoultz**. Yes, sir; we can get that for you.

[The information follows:]

A-7 Costs

The Navy last procured the A-7E in fiscal year 1979 when 12 aircraft were procured at a unit flyaway cost of $6.89M. A recent Vought proposal to the USAF quoted a fiscal year 1983 unit flyaway cost of $13.9M for a quantity of 12-15 aircraft.

Senator **Bingaman**. Thank you, Mr. Chairman.

Senator **Goldwater**. Your approach speed is not all that critical?

Admiral **Schoultz**. No, sir; it is not.

Senator **Goldwater**. I think the F-14 comes down at 135.

Admiral **Schoultz**. Yes, sir, 136. It is not important in that sense. It is not worthwhile spending any money on it. So we just accept 134.

Senator **Levin**. Could you supply for the record the additional tanker capability which is going to be needed because the F/A-18 is not meeting its original range specification? Whether it is tanker hours, number of tankers, however you want to do that for the record.

You obviously are going to need more tanker capability if its range is about 100 miles less than what we thought it was going to be. Apparently you indicated it would need additional tanker capability.

If you could just tell us in some way how much additional capability we need—its range is 525 instead of 614—it would be helpful.

Admiral **Schoultz**. That is a difficult figure to come by. I indicated we are going to have additional tankers because we have the A-6 conversions. We are going to add one more KA-6 to every carrier which will take care of our requirement. I can give you some kind of estimate on that. It is difficult.

When you talk about range, you don't know how far you have to go, what are the requirements. It is scenario dependent.

Senator Levin. We did set a range for 614 for some reason. It was not picked out of the air.

Is there some logic to that figure?

Admiral Seymour. 618 was the original contract spec. The DCP also calls for 550. When I make a contract with the contractor I always ask for a bit more than I am permitted to give to the Defense Department just to be sure that he at least designs so that in case he fails to make it, he won't be so far below that it is unusable.

The 614 was our first specification number. He failed to make it on his cost-plus contract. When he fails to make it then we make a conscious trade, do I want to spend more money, make him spend more money to fix that or save the money and not spend it?

Cost-plus contract or fixed-price incentive contract, once they go above target price I share the expense. In this particular case it was cost plus and 80–20 above the target. He is above target. We made a decision not to spend more money to get that range up to 618.

The latest contract which is the fourth production contract, I believe the firm fixed-price contract has in it instead of 614, 525. That is the current spec because that is the most we were willing to pay to increase it to.

Senator Levin. If he does not meet the 525, he has to fix it?

Admiral Seymour. He has to fix it on his own in order to make the 525.

Admiral Schoultz. We are looking at our whole airwing mix and the numbers of what aircraft we are going to put in the study. It may turn out in that we will have a better handle on what the tanker requirements will be, Senator. I may be able to provide a better answer than I thought I would.

I would like to say one other thing about the F/A–18. We have never had an airplane that we put this much testing and evaluation on. The bill for testing this airplane, over 8,000 hours of testing, is $2 billion. All that is behind us and now for our money we are getting hardware. After we have gone through all the other machinations I think we ought to get on and buy the airplane in numbers that make it economical to purchase.

CH–53E SUPER STALLION

The next aircraft is the CH–53E Super Stallion which has $248 million for procurement, $19 million for initial spares, $7.3 for advanced procurement of 11 aircraft. The price has come down this year. That is after the aircraft manufacturer overcame some of his initial problems with production. He is now doing much better.

Inventory is 60 aircraft currently. This is the aircraft for both the Marine Corps and for the Navy airborne mine-sweeping capability.

The Marines would like to get six squadrons of these. We need two of the airborne mine countermeasure squadrons.

Senator Levin. Will you let us know as you go along any of these procurement items that are not fixed-price contracts?

Admiral Schoultz. Yes, sir. This one is a fixed price.

Senator Levin. Any one that isn't.

Admiral **Schoultz**. All right, sir.

Admiral **Seymour**. AV-8B is the only one that we have covered so far that is not.

Senator **Bingaman**. Mr. Chairman, I want to ask the question I asked earlier about attrition on this particular aircraft.

Do you have a figure for the attrition that you experience with this one?

Admiral **Schoultz**. We have lost three aircraft so far. The attrition is figured at one every 2 years.

Admiral **Seymour**. Very low rate.

Senator **Bingaman**. How many of these are you looking to buy this year.

Admiral **Schoultz**. Eleven, sir.

Senator **Bingaman**. Thank you.

E-2C HAWKEYE

Admiral **Schoultz**. The next aircraft is E-2C Hawkeye. The E-2C is fixed price. The procurement cost is $345.8 million and includes $10 million for initial spares, 25.6 for advanced procurement for six aircraft is fiscal year 1985.

Flyaway unit cost of this airplane is $38.9 million.

The increase in cost primarily is for support for the new radar that has gone into the aircraft called TRAC-A. It is in limited production. It is an improvement in the radar, both in range and in capability.

Senator **Bingaman**. Could I ask a question on this?

Senator **Goldwater**. Yes.

Senator **Bingaman**. You are proposing to buy six of these this year?

Admiral **Schoultz**. Yes, sir.

Senator **Bingaman**. What is your attrition rate on these?

Admiral **Seymour**. [Deleted] every 2 years is forecast.

Admiral **Schoultz**. It is forecast [deleted] every 2 years. We have lost a total of four of these airplanes since we have been buying it.

Senator **Bingaman**. How many do you have in your inventory of these?

Admiral **Schoultz**. Sixty-seven as of the end of last year.

Senator **Bingaman**. Thank you.

C-2

Admiral **Schoultz**. The next aircraft is the C-2 which is the Greyhound. This is on a multiyear procurement and a firm fixed price for $226 million total procurement cost for eight aircraft and that includes $23 million for initial spares, $37 million for advanced procurement for eight aircraft in 1985.

Flyaway unit cost for this one is $19.6 million. Twelve of the original 19 C-2 airplanes remain and we haven't predicted attrition on this one, I don't think. We are hoping that we don't have any of them lost, but we are going to buy 39 of them over a 5-year period.

The multiyear contract is estimated to save about $89 million by doing this multiyear.

Senator BINGAMAN. Mr. Chairman, I want to ask on these where you are buying just a few each year and you have multiyear contracts——

Admiral SCHOULTZ. This is the only multiyear contract buy we have, Senator.

Senator BINGAMAN. What kind of penalty is built into these multiyear contracts if we were to change our mind and decide we needed to shut down a production line?

Are we reducing our option substantially?

The chairman pointed out there are 16 production lines for aircraft that you folks are using.

Admiral SCHOULTZ. Yes, sir.

Senator BINGAMAN. Is our ability to reduce that substantially impaired by entering into these multiyear contracts?

Admiral SCHOULTZ. I am going to let the contractor experts talk about that.

Admiral SEYMOUR. We did not give up the capability of terminating it at any time. There is a penalty, though, Senator and in the case of the C-2 which is the Navy's only multiyear contract in aviation, it is less than $100 million.

The penalty increases through 1983, then it decreases as you go through the 4 years. We started last year, there was language about it this year. We have to come back to the Congress to get their approval to continue with it.

That reprograming is in the Congress.

Admiral SCHOULTZ. That letter came over the 14th of February.

Senator BINGAMAN. When we had John Lehman testify to the full committee I asked him what kind of penalty was built into the contract for the two aircraft carriers if there were a decision to cancel one of those or both of those.

He said it would be more expensive to cancel them than to build them which seemed to me a fairly incredible statement. I would be interested in knowing what the comparison is here, just to know whether or not Congress still has options in some of these areas.

Obviously the question of whether they exercise it is completey different.

Admiral SCHOULTZ. Yes, sir. There is a penalty obviously in shutting off a multiyear, but I don't know what it is.

Admiral SEYMOUR. The savings that the Government receives, what we figure now is a total of $89 million completing the whole thing.

If we were to cancel this year the maximum cost would be $59.1 million which is still less than the expected savings.

Looking at it in that direction there is really no limitation on the Congress canceling if they desire to. We will not spend more than we would have otherwise. We will save it if we go multiyear.

We picked this one because it was a new add-on buy to the C-2 which is already in inventory. We knew just what the requirement was. It was a block of 39 airplanes and it seemed to be not exposing us too much while we got into the multiyear time of doing business in large programs, but a very sensible one that would give us across this 5-year period the 39 airplanes and we would be done.

Senator BINGAMAN. Thank you, Mr. Chairman.

EP-3

Admiral SCHOULTZ. The EP-3 is shore based, of course, and is our electronic surveillance aircraft, both signal and voice.

Total procurement cost of $89 million. This includes 0.2 for initial spares and $12 million for advance procurement for three aircraft in 1985.

Flyaway unit cost on this is $43.9 million.

Mr. Chairman, that is all I have.

With your permission, I would like to ask General Fitch to discuss the Marine Corps tactical aviation program now.

Senator GOLDWATER. General Fitch, it is nice to see you here.

STATEMENT OF LT. GEN. WILLIAM H. FITCH, MARINE CORPS DEPUTY CHIEF OF STAFF FOR AVIATION

General FITCH. Thank you, Mr. Chairman.

First, I have a prepared statement that I would ask be included in the record with your permission.

Senator GOLDWATER. It will be.

[The prepared statement of Lt. Gen. William Fitch follows:]

PREPARED STATEMENT OF LT. GEN. WILLIAM H. FITCH, U.S. MARINE CORPS, DEPUTY CHIEF OF STAFF FOR AVIATION

Mr. Chairman, distinguished members of the committee, it has been a privilege to address the committee on the status of Marine aviation. I would like to thank you for the strong support which over the past year has allowed us to make significant progress in increasing our combat capabilities. I am pleased to report to you that this past calendar year we recorded our best year ever in aviation safety (mishap rate of 6.13 mishaps per 100,000 flight hours), and at the same time our highest rates ever in full mission capable (FMC) and mission capable (MC) aircraft. In short, we are more combat ready than ever and we are conserving our valuable assets. We have been delivering new weapons systems to the Fleet Marine Forces and these systems are meeting or exceeding all of our expectations. I would like now to address several aviation programs of particular importance to the Marine Corps.

As in the past years, the AV-8B Harrier program remains the key element in the Marine Corps' modernization of its light attack force. The Harrier program is proceeding with four Full Scale Development (FSD) aircraft in flight test at this time, and we are about 60 percent complete with the full scale development effort. Performance improvements that have been identified during preliminary evaluation are being installed in test aircraft and will be incorporated in all production blocks. Test results to this point have been encouraging and we are confident that the AV-8B will fully meet our expectations. The first limited production AV-8B will be delivered to the 2d Marine Aircraft Wing in November 1983.

To safely and efficiently transition to an all V/STOL light attack force, the Marine Corps needs a modern two-seat trainer version of the AV-8B). My predecessor, Lieutenant General White, stated in his remarks to Congress last year (Senate Appropriations Committee, 27 May 1982), ". . . we fully intend to fund development of this two-seater AV-8B, (i.e., both) the procurement cost and development, from the total 336 aircraft program, which means we are prepared to trade single-seaters for two-seaters." The Marine Corps intends to stay within planned program cost. The TAV-8B is a low risk technical development, and it can be delivered in time to meet our peak training demand which begins in 1986. With your continued support for both the AV-8B and the TAV-8B versions of the advanced Harrier, we should attain our goal of an all V/STOL light attack force which will give us a unique capability for close air support of our ground Marines.

The modernization of our fighter-attack (VMFA) force is also progressing very well with the fleet introduction of the F/A-18 Hornet. After completing transition training with VFA-125, our joint Navy-Marine F/A-18 training squadron at NAS Lemoore, VMFA-314, stood up on 7 January of this year at Marine Corps Air Station (MCAS) El Toro, California. VMFA-323 and VMFA-531 are already well into their transition training at NAS Lemoore. By August we will have all three of these F/A-18 squadrons operating from El Toro.

The F/A-18 will provide Marine Aviation a significantly enhanced combat capability over the aging F-4 it replaces. In both the fighter and attack roles it has already demonstrated clearly superior handling, performance, and weapon delivery accuracy. Further, the reports from both VMFA-314 and VFA-125 indicate that not only does the aircraft have the superb qualities previously mentioned, it is an easy aircraft to learn to fly. This should result in our aircrew becoming comfortable and competent in the aircraft more quickly than with most previous aircraft. Additionally, all reports indicate that the aircraft is equaling or exceeding reliability and maintainability specifications, a welcome report to the Marine Corps and all of Naval Aviation.

Of continued importance to the Marine Corps is the all weather close air support (CAS) capability of the A-6E. Even after 18 years of outstanding service to marine Aviation, the A-6 remains unsurpassed in its ability to provide effective close air support to our ground Marines in all weather conditions day or night. The A-6E TRAM with its Foward Looking Infra-Red (FLIR) and Laser Designator Ranger (LDR) has a proven capability to provide both night and all weather close-in interdiction and CAS ordnance delivery, which further demonstrates its superior capabilities as a weapons platform.

A relative, the EA-6B, is the free-world's best electronic warfare aircraft. We currently operate a 15 plane EA-6B squadron at Cherry Point, N.C. with detachments deploying both aboard aircraft carriers and to the Western Pacific. In view of the growing Soviet SAM and fighter threat, the importance of this aircraft grows daily. The continued procurement of the EA-6B is vital to ensure our success on the modern battlefield.

Our CH-53E Super Stallion heavy lift helicopter continues to prove its worth every day. We now have two complete 16 plane CH-53E squadrons, one at MCAS(H) Tustin, California and one at MCAS(H) New River, North Carolina. In fiscal year 1984 we plan to introduce the CH-53E into a training squadron, and in fiscal year 1985 a third tactical squadron will be activated. By all accounts, the CH-53E is an outstanding operational success; its performance is exceeding our original expectations. In training, both CH-53E squadrons have routinely lifted 14.5 ton practice loads and have regularly supported our Marine ground units at Camp Pendleton, California and Camp Lejeune, North Carolina. In operational tests, the aircraft has demonstrated its capability to lift 16 tons. This past year the CH-53E accomplished the very demanding task of lifting several Light Armored Vehicle (LAV) candidates in operational tests conducted at the Marine Corps Air Ground Combat Center (MCAGCC) at 29 Palms, California. The 11 CH-53Es requested in fiscal year 1984 will form the nucleus of our third tactical squadron. Three squadrons will minimally meet our current heavy lift requirements for ship-to-shore movement of the M-198 Howitzer at 8 tons and its prime mover at 12.5 tons.

Another helicopter program of considerable importance is the AH-1T Cobra. The one year slide in the procurement of 44 additional Cobras (22 aircraft in fiscal year 1985, 22 in fiscal year 1986) compounds an existing shortage of anti-tank, attack helicopters in both our active and reserve Wings. At present we have two active AH-1T squadrons and one active AH-1J squadron. The Progammed Aircraft Allowance (PAA) for each of these squadrons is 24 aircraft, however our AH-1T squadrons are currently operating with only 21 aircraft each. Although our active force AH-1J squadron has 24 aircraft, at present it lacks any anti-armor capability. Our reserve AH-1J squadron has a PAA of 24 aircraft, but only has eight aircraft assigned. The long lead funding of $17.8M requested in fiscal year 1984 is vital to ensure our procurement of 22 AH-1T's in both fiscal year 1985 and fiscal year 1986. These aircraft will permit us to flesh out our anti-armor capability to three active AH-1T and one reserve AH-1J squadrons, and constitutes an important step toward our goal of 6 active and 2 reserve attack helicopter squadrons. Of additional concern is the requirement to upgrade the engines of our existing AH-1T aircraft. The assumption of the anti-armor mission and the weapons required (TOW, etc) to accomplish this mission has driven up the empty weight of the Cobra. At present, on a hot day at 3000 feet of elevation (a situation common to many Middle East contingency areas), with a full load of anti-armor ordnance and fuel, the AH-1T is incapable of hovering out of ground effect. Hovering out of ground effect is required to fire the TOW missile. The capability enhancement which can be gained by the incorporation of a T-700 engine package is remarkable for the small investment required. With the T-700 engine package, a fully loaded (ordnance and fuel) AH-1T Cobra can hover out of ground effect at terrain elevations of 3000 feet above sea level, even at temperatures above 90°F. The serious threat posed by Soviet armor clearly demands that our capability be upgraded quickly.

Our remaining helicopter force, composed of CH-46Es and CH-53A/Ds, is aging rapidly, and our declining inventory is of great concern. Due to the effects of inadequate performance capabilities and of peacetime attrition, the aging CH-46 and CH-53A/D force lacks the ability to meet our assault lift requirements for the 1990's and beyond. As a replacement aircraft the Joint Services Advanced Vertical Lift Aircraft (JVX) provides for a 250 knot assault transport that is self-deployable worldwide. Our urgent need for the JVX stems from our requirement both for modern replacements for the current force and for the need to avert the critical lift shortfall that would occur were JVX not introduced in 1991. Capable of lifting 24 Marines up to a 200 nautical mile mission radius, the JVX will have the ability to rapidly penetrate deep into enemy rear areas, and to bypass adverse terrain and weather threats. R&D funds requested in fiscal year 1984 are important to maintain our development schedule which will lead to delivery of the first JVX to the Marine Corps in 1991.

In view of the magnitude of the Soviet armor threat, Marine Aviation has directed a great deal of attention to Precision Guided Munitions (PGM's) which can successfully engage enemy armor at stand off distances. Hellfire and Laser Maverick are two such weapon systems that can meet the threat head-on and defeat it without unacceptable attrition of aircraft.

Hellfire is the new PGM weapon being procured for use by our attack helicopter force. Hellfire represents a major improvement over the TOW system. Whereas the TOW missile requires the helicopter to remain vulnerable while the missile is guided in flight, the laser guided Hellfire permits a shoot-and-leave operation. The tank or other armor target can be laser designated by the ground force commander and, after the Hellfire is fired, the helicopter can depart before entering the enemy's anti-aircraft kill zone. Hellfire, with a fiscal year 1986 IOC, will provide the ground commander with a much needed increase in tank killing punch.

Laser Maverick, our PGM choice for the close air support mission, will afford the same type of aircraft survivability for our AV-8B, A-6E, F/A-18 and A-4M aircraft. Laser Maverick, with its unique 300 pound warhead (the largest of any U.S. antitank PGM), offers outstanding target lethality and is optimized for the close air support environment. The key element in the optimization of Laser Maverick in the close air support environment lies in the Modular Universal Laser Equipment (MULE), which permits the ground commander to both select and designate the greatest threat to his unit. Even a near miss with Laser Maverick will damage both hardened surface targets and the most heavily armored Soviet tanks. Laser Maverick permits not only the shoot-and-leave option, but also provides the crucial margin of safety for friendly troops in close air support operations. Testing to date has been impressive, with 15 successes in 15 shots. Our planned IOC of fiscal year 1985 still looks solidly achievable.

Modernization efforts are progressing as well in our air defense capability. Tactical Air Operations Center—1985 (TAOC-85) is a modular, state-of-the-art, real-time air control system that will manage airspace and coordinate, as well as control, both interceptor aircraft and surface to air missiles. The modular design of the system will greatly increase its mobility and reduce strategic air/sea lift requirements. Operational evaluation of TAOC-85 will commence in 1984, with a planned IOC of 1988.

To match the air control capabilities of TAOC-85 we are procuring in fiscal year 1983 the AN/TPS-59 Radar to give us a long range, three dimensional air defense surveillance radar. The TPS-59 is considered to be the world's finest air defense radar. It possesses superior ECM capabilities, improved reliability and maintainability, and an overall unsurpassed performance.

Up till now I have addressed primarily our active duty forces; however, our modernization efforts have also begun to yield substantial dividends for our reserve components. For example, the introduction of the AV-8B into our active force light attack squadrons will result in the transfer of the A-4M aircraft and Laser Maverick missile to the Reserves; the first A-4Ms have just arrived in our reserve force. This type of crossover effect is also true for the AH-1T which will free up AH-1J aircraft for transfer to the Reserves. As we improve our active Marine Aircraft Wings (MAWs), we also improve our Reserves Wings as well, and the dividend to the national defense posture is magnified. Additionally, the Congress has provided for four KC-130T aircraft (fiscal year 1982 procurement), which are scheduled to join our Reserves during Oct-Dec 1983. These will be followed by two more in the fiscal year 1983 procurement.

I would like to thank the committee for its strong support over the past year. With your help, we are embarking on an era of modernization that will allow us both to maintain our readiness and to enhance our capability to meet the modern threat.

This concludes my formal remarks. I am ready to answer any questions. Thank you.

MARINE CORPS AVIATION

General **Fitch**. I would like to give an overview of Marine aviation as an integral element of naval aviation this morning.

Status of Marine aviation, calendar year 1982

We are doing well:	
Maintaining assets:	
Overall aircraft mission capable (MC) (percent)	71
Overall aircraft full mission capable (FMC) (percent)	54
Conserving assets: Mishap rate—Lowest ever	6.13
Training readiness: Tactical squadrons (percent)	[1] >80

[1] Substantially or fully combat ready.

First, as we look at the status of Marine aviation for 1982 we find that we are doing extremely well. In our aircraft readiness this last year we have enjoyed the highest readiness that we have had in the history of Marine aviation.

Mission capable, 71 percent overall; full mission capable, 54 percent overall. This is based on a 24-hour clock.

We are also conserving our assets. Our mishap rate was the lowest ever: 6.13 mishaps per 100,000 flight hours. I should comment that in this calendar year we are now at approximately 2.75 major mishaps per 100,000 flight hours.

Our tactical squadrons are very ready. Over 80 percent are substantially fully combat ready.

AH-1T—Near-Term Objectives

Raise active squadrons to authorized strength; raise reserve squadron to authorized strength; fiscal year 1984 submit: $17.8M (advanced procurement).

The first aircraft I would like to discuss is the AH-1T Sea Cobra. Our near term objective in the Sea Cobra program is to raise our active squadrons to their authorized strength. At the present time we have two AH-1T squadrons and one AH-1J squadron. The AH-1T squadrons do not have the number of aircraft they are supposed to have assigned. They are short.

We also want to raise the reserve squadron to its programed aircraft allowance. We presently have 8 aircraft in the squadron in Atlanta where we should have 24. In 1984 we are requesting $17.8 million in long-lead funding. This is for the plan to procure 22 aircraft in 1985 at a cost of $174.8 million plus $21.2 million for initial spares and $15.0 million for fiscal year 1985 advance procurement.

AH-1T—Marine Corps Requirement

Assault support: Armed escort for transport Helo's; close in fire support for ground forces.
Anti-armor capability.
Forward air control (airborne)—FAC(A).

Our requirement for this aircraft is for assault support. We also have an antiarmor capability which has been a requirement for the past 5 years.

AH-1T—MARINE CORPS UTILIZATION

Anti-armor: Tow; Hellfire.

Armed escort: Sidewinder (Aim 9); gun (20mm); rockets.

Antiradiation: Sidearm.

Enhancements: T-700 engine (high/hot requirement); wire cutters; night vision; ECM/DECM survivability suite.

We also do the forward air controller airborne [FAC(A)] mission.

In the antiarmor role we utilize the improved TOW. We plan to introduce TOW II in 1987. We also plan to use Hellfire beginning in 1986.

We are equipping aircraft with the AIM-9 missile. It also has a 20-millimeter gun and fires rockets.

In the antiradiation role, primarily against the ZSU-23 and also against the SA-8, we have the Sidearm missile which is in development. It is an adaption of the Sidewinder AIM-9C we plan to introduce in 1985.

ENHANCEMENTS

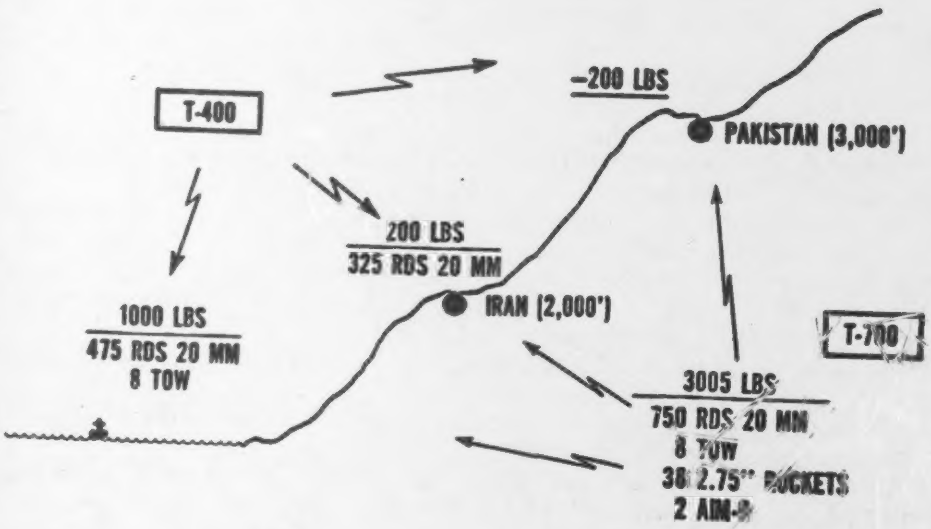
We are currently addressing reengining of this aircraft with the T-700 which is currently in other aircraft such as the AH-64, the Black Hawk and the LAMPS MK-3.

We are looking to put a wirecutter on the aircraft. Night vision enhancements at this point in time are primarily the night vision goggles. We have the ECM DCM capability being added to enhance survivability.

AH-1T "ANY CLIME AND PLACE" CAPABILITY

ORDNANCE PAYLOAD

(91.5° F)


T-400
–200 LBS
PAKISTAN (3,000')
200 LBS
325 RDS 20 MM
IRAN (2,000')
1000 LBS
475 RDS 20 MM
8 TOW
T-700
3005 LBS
750 RDS 20 MM
8 TOW
38 2.75" ROCKETS
2 AIM-9

Looking at the reengining requirement, the upper left corner of the slide depicts the T–400 engine on a 91.5-engine Fahrenheit day which is fairly typical in many areas. This aircraft at sea level can carry a payload of 1,000 pounds of ordnance.

At higher elevations such as 2,000 feet, as you might encounter in Iran or other mountainous terrain, the aircraft can only carry a payload of 200 pounds. Say 325 rounds of 20-millimeter ammunition.

Higher elevations, yet again at 91.5° Fahrenheit, you have to download 200 pounds of fuel with the current engine before you can put the first bullet on the airplane and retain the capability to hover out at ground effect.

With the T–700 engine, shown in the lower right corner, this aircraft will be capable of hovering out of ground effect while carrying a maximum load of 3,005 pounds on a 91.5° Fahrenheit day at 3,000 feet elevation. If you went to 120° Fahrenheit this aircraft would be capable of carrying a load of 2,600 pounds and hovering out of ground effect at a mountainous elevation of 3,000 feet.

AH–1T

Program status:—Long lead money for 22 AH–1T's in the fiscal year 1984 budget procured AH–1T's will be equipped to fire the TOW antitank missile and sidewinder air to air missile; fiscal year 1985/1986 buy leads to an all TOW firing Cobra force in the active structure; additional 15 ACFT required for pipeline/attrition. No funding available at present.

Procurement profile (fiscal year 1984 FYDP): A/C (quantity): Fiscal year 1985, 22; fiscal year 1986, 22.

Status of the program: Following year funding is being requested for procurement in 1985. These aircraft will be equipped with TOW antitank missiles. We are looking for further procurement in 1986 for an additional 22 aircraft.

Not currently programed are 15 aircraft required for pipeline and attrition.

Senator GOLDWATER. That Cobra is a very good airplane.

General FITCH. It is an excellent airplane, Mr. Chairman. We do feel strongly, though, that we need a better engine for the aircraft.

Senator GOLDWATER. We have needed that for a long time. It is one of the best gun platforms we have.

General FITCH. Yes, sir.

Senator BINGAMAN. On that Cobra you are saying that at 91° F. at reasonable altitudes you can't carry any ammunition?

General FITCH. And hover out of ground effect. In order to fire, for example, the TOW missile, the aircraft goes into a hover, normally above the tree line, in order to properly fire the TOW missile. When you get to the higher elevations and higher temperatures the aircraft cannot acomplish that.

Senator BINGAMAN. That sounds to me like a mistake in the design of the aircraft originally.

Am I confused or was the aircraft never intended to do what you are now doing with it or what?

General FITCH. What has happened is that we started with an aircraft in 1978, the AH–1T which then weighed 8,000 pounds. Since then we have added the TOW capability which adds 525 pounds to the airplane.

We are adding Hellfire which adds 325 pounds to the airplane, ECM equipment and some other modifications such as the Sidewinder and that adds up to over a 1,000 pounds increase in weight.

What we have is an airplane that has grown in its operating weight and empty weight also, but which has not had an uprated engine.

Senator **Bingaman**. Thank you.

CH-53E

General **Fitch**. This is the CH-53E.

SYSTEM DESCRIPTION

	CH-53D	CH-53E
Dimensions:		
Overall length	88 ft 6 in	99 ft 5 in.
Main rotor diameter	72 ft (6 blades)	79 ft (7 blades).
Tail rotor diameter	16 ft (vertical)	20 ft (20° canted left).
Engine H.P	3,780 SHP (2 engine)	4,380 (3 engine).
Empty weight	22,900 lb	33,685 lb.
Max gross weight	42,000 lb	73,500 lb.
Internal (landing)	42,000 lb	69,750 lb.
External	42,000 lb	73,500 lb.
Fuel capacity	4,200 lb	15,000 lb.

This slide shows the comparison with the CH-53D which has been in service in the Marine Corps for a considerable period of time. I should point out there is a difference in the overall length. You will see 99 feet for the E as compared to 88½ feet for the D.

In addition to greater rotor diameter, engine horsepower is increased because you have three engines in the 53E compared to two in the 53D. The maximum gross weight you will see is significantly higher. Also the fuel capacity of the 53E is 15,000 pounds compared to 4,200 pounds.

CH-53E—MARINE CORPS REQUIREMENT

16-ton, lift 50 nm radius.

Increased capability to meet FMF needs: Introduction of heavier ground weapon; and increased combat flexibility.

Six squadrons minimally meet heavy lift requirements.

Fiscal year 1984 submit: $243.3M (11 ACFT).

The 53E is the highest performing heavy-lift helicopter in the free world. It will lift 16 tons and carry it a 50-nautical-mile radius. It has demonstrated this on numerous occasions. It has the capability to meet the needs of the Fleet Marine Force, which are growing as we introduce heavier weapons, such as the light armored vehicle [LAV] M-198 Howitzer, and so forth.

We feel in the Marine Corps that six squadrons will minimally meet the heavy-lift requirements in the future. Our fiscal year 1984 procurement is $243.8 million for 11 aircraft.

CH-53E—MARINE CORPS UTILIZATION (ROLE)

Assault support (heavy equipment).

Capable of lifting: 155 Howitzer (M-198); and prime mover.

Light armored vehicle (LAV).

Mobile logistic support elements.
Aircraft retrieval capability.

The role of the aircraft is in assault support primarily moving heavy equipment as opposed to moving infantry troops. It is capable of lifting the vehicles I mentioned as well as the mobile logistics support element. It is also capable of retrieving other aircraft and in fact can retrieve itself if required.

In the case of the EA-6B, you have to take the engines out of the airplane before the 53E will lift the EA-6B.

Senator GOLDWATER. How many troops?

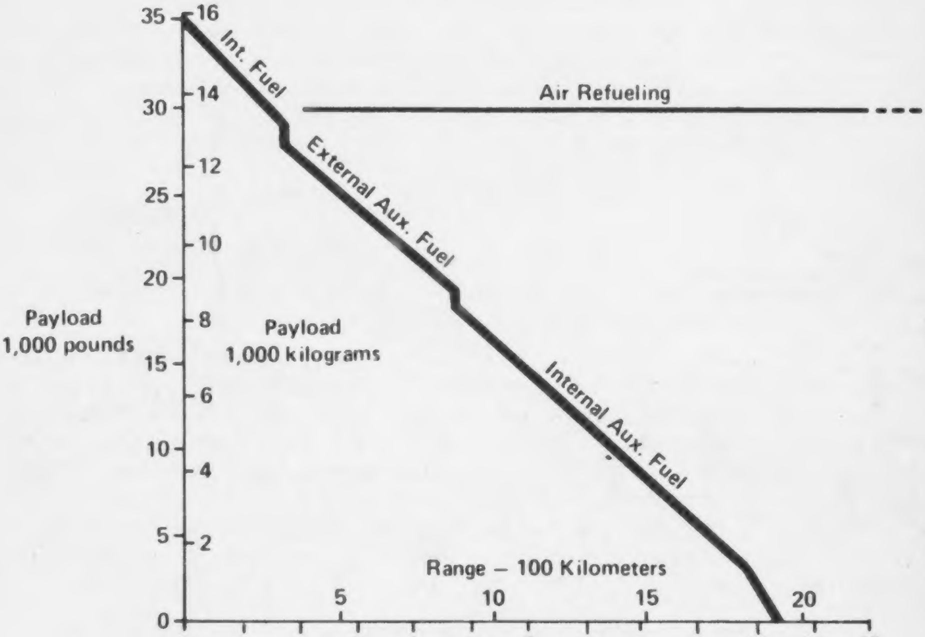
General FITCH. I think it is 55 troops. Normally it is not used in troop carrying. The medium assault helicopter CH-46E is our normal troop carrier.

CH-53E—PROGRAM STATUS

HMH-464 in operation (New River).
HMH-465 in operation (Tustin).
HMT-301 training element activates October 1983.
HMH-466 activates October 1984.
Procurement profile: USN/USMC: fiscal year 1983, 0/11; fiscal year 1984, 0/11.

We have two CH-53E squadrons in operation. Later this year we will introduce the aircraft into our training squadron. Next year we will introduce our third tactical squadron.

PAYLOAD/RANGE
S. L. 90° F



The significance of this aircraft is its range capability. Normally you look at a helicopter as being relatively short range, on the order of 200 miles. You will see this aircraft with the range across the bottom of the slide, is capable of flying 1,000 miles without aerial refueling and, of course, that range can be extended with air-to-air refueling.

[Chart deleted.]

This VuGraph shows the aircraft being refueled from the KC-130.

CH-53E

Fleet introduction is going extremely well.

In summary of this aircraft, and it is an expensive aircraft, the fleet introduction is going extremely well. During the last calendar year this aircraft had 71 percent mission capability readiness based on a 24-hour clock.

[Chart deleted.]

The next aircraft is one, Mr. Chairman, that you specifically asked to be addressed, the JVX. This is an artist's concept of what the JVX might look like, flying from an amphibious assault ship.

JVX REQUIREMENT

Replace CH-46E and remaining CH-53A/D with modern assault transport.

Provide Army EW aircraft, Navy and Air Force combat SAR and Air Force special OPS transport.

552 Marine assault transports; 1,086 total requirement.

Fiscal year 1991 deliveries to avert critical lift shortfall.

The requirement in the Marine Corps for the JVX is to replace the CH-46E and also the CH-53A and D with modern medium assault transport.

For the Army it will provide an electronic warfare aircraft, for the Navy and Air Force it will provide combat SAR and specified transport.

The Marine requirement is the highest on any of the Services, 552 aircraft out of a total of 1,086 requirement. We are looking for a fiscal year 1991 IOC for this aircraft when a shortfall begins in our medium assault assets.

Senator GOLDWATER. What size are you asking on that? What passenger load?

General FITCH. It will be capable, Mr. Chairman, of carrying 24 fully equipped troops. It will also be capable of carrying 10,000 pounds of external lift.

Senator GOLDWATER. What size engines will that be?

General FITCH. We are looking to use the T-64 which is currently in the CH-53. We are looking to use the T-64 for the initial development of this aircraft, initial testing and also initial deliveries for the first couple of years. Then we would transition to the modern technology engine which is an Army-Air Force development.

Senator GOLDWATER. Does it run around 3,000 pounds?

General FITCH. I think it is around 5,000 horsepower.

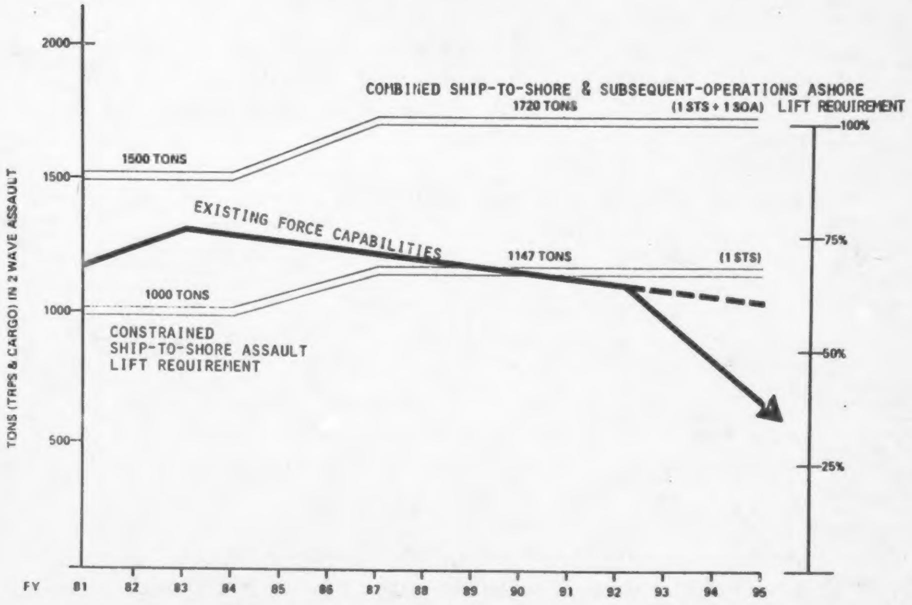
Senator GOLDWATER. It is a new engine?

Major MAGNUS. The T-64 engine that will be put in the development aircraft in the initial buy will have 4,300 shaft horsepower, the same as in the existing CH-53E aircraft. The Army's modern technology engine is being developed to provide 5,800 shaft horsepower. The major benefit of the modern technology engine is not only increased shaft horsepower, but about 15 percent improvement in specific fuel consumption.

Admiral SCHOULTZ. We have the program manager here. Would you like to discuss the JVX program now?

We will do it later.

CURRENT FORCE CAPABILITY VS. MARINE LIFT REQUIREMENT
1 MAF STS + 1 MAF SOA
TROOPS AND CARGO



General FITCH. Mr. Chairman, this slide shows why we have a critical need for JVX in the Marine Corps. If you look along the vertical, you will see the number of tons required in a Marine amphibious force (MAF) assault and across the bottom shows the years.

At the 1,000-ton level you will see at the current time we have excess lift capability in the Marine Corps in cur medium assault lift aircraft.

As we move out to 1991 we go below the capability to lift one MAF assault element. If you look at the capability to lift one MAF ship to shore as well as subsequent operations ashore, you will see we never have that capability.

The critical point is 1991 when we will start losing our capability to lift the assault element of one MAF.

JVX REQUIREMENT

Characteristics: 200 NM radius with 24 troops at 250 KT cruise; 50-110 NM radius with up to 10,000 lb external cargo; self-deployable over 2,100 NM without aerial refueling; compatible with present/planned amphibious shipping; ramp, multipoint cargo hooks and cargo handling system; state-of-art reliability and maintainability and survivability.

JVX requirement, the characteristics: 200-nautical-mile radius with 24 troops at 250 knots cruise. Fifty mile minimum, 110 mile desired radius, with a 10,000-pound external load.

Very important, and one of the key features of this aircraft, is that it will be self-deployable over a 2,100-nautical-mile range without aerial refueling. The aircraft will in fact have an aerial refueling capability which can extend that range further.

Our current helicopters, of course, with the exception of the CH-53E, are quite limited in range and require ships for anything over and beyond 200 nautical mile movements.

We will have state of the art reliability, maintainability and survivability built into the JVX.

JVX IMPLICATIONS

Strategic: Rapid deployability worldwide: New River to Norway in 1½ days; N. California to Hawaii within 10 hours; New River to Oman in 2½ days.

Tactical: Speed, radius, surprise: Rapid reinforcement from 200 NM standoff; raid/special OPS/evacuation to 200 NM penetration; circumnavigate unfavorable terrain, weather, threat; complicates enemy mobile reserve usefulness; strike quickly on flanks/rear areas; night, marginal weather capability; permits dispersed amphibious task force; long range preassault reconnaissance in force OPS/raids/demos.

The implications of the program: strategic, rapid deployability worldwide. You will be able to take this aircraft from New River, N.C., and move to Norway in 1½ days. That allows for 14 hours of crew rest enroute. From northern California to Hawaii, 10 flight hours. A move from New River, N.C., to Oman, 2½ days, including 26 flight hours and again including crew rest.

It will have the benefit of high speed which provides for tactical surprise and it will complicate an enemy's mobile reserve usefulness because of the ability to strike well behind his lines.

Further, it will dispersed task force operations, and long-range assault reconnaissance.

JVX FORCE STRUCTURE

Replaces 3 existing models with 1 model.

Common logistics with Army, Navy and Air Force: 16 FMF squadrons with 15 PAA equals 240 aircraft; 2 Reserve squadrons with 15 PAA equals 30 aircraft; 2 training squadrons with 20 PAA equals 40 aircraft; 1 exec support squadron with 15 PAA equals 15 aircraft; RDT&E, pipeline and 20 year's attrition equals 227 aircraft. Total planned procurement equals 552 aircraft.

Provides most manpower and ship efficient alternative.

Provides smallest inventory.

Yields quantum increase in strategic and tactical capabilities.

This is our requirement. JVX will replace three existing types of aircraft, CH-46E, CH-53A and CH-53D.

We will have 16 Fleet Marine Force squadrons with an authorized strength of 15 aircraft each. Two reserve squadrons, 2 training squadrons with 20 aircraft each and 1 executive support squadron with 15 aircraft. These will be the Presidential support aircraft. The other aircraft required are for pipeline attrition and research and development, a total of 552.

It provides the most manpower and ship efficient alternative. If we don't introduce this aircraft, then in order to maintain our amphibious lift capability with helicopter assault, we will require additional amphibious ships to provide adequate flight decks for a larger inventory of less efficient aircraft.

It does yield a quantum increase in strategic and tactical capabities.

JVX ACQUISITION STRATEGY

Milestone O: 30 Dec. 81 DEPSECDEF decision for joint program.

Milestone I: 8 Dec. 82 DEPSECDEF go ahead for competitive 23-month preliminary design phase.

Navy lead service (27 Dec 82) for JVX R&D; preliminary design request for proposal (RFP) release during January 1983. Navy pays 50 percent JVX common R&D.

Army lead service for modern technology engine (MTE) R&D. Army pays 34 percent JVX common R&D. Three services equally share common engine R&D.

Milestone II: Fiscal year 1985 JVX FSD source selection.

First FSD flight: Fiscal year 1987.

DT, OT and fiscal year 1991–92 Marine Corps deliveries with T–64 engines.

Fiscal year 1993 and subsequent deliveries for all services with modern technology engines.

Milestone I occurred on December 8, 1982, when the Deputy Secretary of Defense gave the go-ahead for a 23-month preliminary design competition.

Senator GOLDWATER. Let me ask you a question at that point.

I understand that Sikorsky has indicated it is not going to continue in this competition. It that true?

General FITCH. It is my understanding that Sikorsky did not submit a proposal.

Senator GOLDWATER. Have they indicated they are not going to submit a proposal?

Admiral SEYMOUR. Yes, sir. Sikorsky has given us a letter saying they intend no bid.

Senator GOLDWATER. You have Boeing and Bell, one supplier?

Admiral SEYMOUR. We have received a proposal from the Bell and Boeing teams, yes, sir.

Senator GOLDWATER. Do you think Sikorsky might change its mind?

Admiral SEYMOUR. No, sir.

Senator GOLDWATER. It will be hard to sell this without competitive bidding.

Admiral SEYMOUR. We are currently in source selection, Mr. Chairman. The Navy will not in open session confirm or deny whether or not there is one or more bidders. There is a lot of speculation on how many offers we have received. We are looking at the possible changes in acquisition strategy to get more competition into the program.

Senator GOLDWATER. The Army has indicated they might withdraw their support for the JVX. Will that have an effect on the Navy-Marine program?

Admiral SCHOULTZ. Yes, sir, it will have an effect and we are hoping that it is not true. We hope that OSD will keep them in the program. This is a multiservice program. I have both the program managers. Maybe they have looked in detail at that new development of Army reluctance. They are getting a little cool on the program.

In fact, that is why the Navy originally took the lead because it didn't look like they were going to make it in time to fulfill the Marine requirement. So we pressed forward.

Would you mind if I asked the program manager, Colonel Creech?

When the Army had the lead in the program we insisted on having a Marine program manager.

Colonel **Creech**. Mr. Chairman, I cannot comment about the news I have read in the papers about the Army Secretariat perhaps pulling out of the program. However, I have charged my engineers with reassessing the performance requirement, given that the JVX, without them, would not have to fly at 30,000 feet for 4 hours endurance which is the Army's mission profile.

We are reassessing that now. I can't at this time give you the number.

Senator **Goldwater**. You know there is one big factor that the services overlook in this. To me, the great future of this type aircraft is going to be in commercial aviation. I can see the day, whether we buy them or not for the services, when we are going to have large versions that will fly from downtown Washington to downtown New York in 45 minutes and without bus service, taxi service, and all of that.

I can see the extended range, including Chicago to Washington, Chicago to New York. I may be slightly prejudiced, but I think it is one of the greatest things to come along since the Wright brothers.

I would hope we could get the Army back in the act. I know how the Navy feels. I know how the Marines feel. We will have to put the muscle on our Army friends and see if we can't bend them a little bit. Usually it is the Navy that is hard to please. Now we have the Army.

Colonel **Creech**. I might add that in the area of source selection where we are evaluating proposals that we have 27 Army engineers on board at Navair helping the Navy assess proposals. At the working level I can say nothing but good things about how the services are acting together to get on with the program.

Senator **Goldwater**. Thank you very much. I will have a talk with my friend, Morris, about this.

General **Fitch**. Mr. Chairman, I might say that one of the significant points to be made is that we are moving into a preliminary design phase which will last approxiamtely 23 months. Once that is completed, then there will be a decision, milestone II decision, as to whether we will proceed on full-scale development.

Senator **Goldwater**. Do you believe that Sikorsky's long-time dedication to the contra rotor concept has anything to do with their reluctance to go into this? Do they see the contra rotor as competiton to this?

Admiral **Schoultz**. No, sir. I understand in talking to Sikorsky management that their reluctance was that they needed a copartner in the fixed wing area, to make their bid and they couldn't find anybody that wanted to go in with them.

They thought the risk was too high for them to go into it by themselves, not knowing what was required in the wing and that type of technology. They had a couple lined up and they both backed out. When the Navy came up with the program we put requirements on for material and that sort of thing. When Sikorsky lost support of their compatriots they decided they couldn't make it by themselves.

Senator **Bingaman**. It seems to me that there is a trend of either upgrading or going to new aircraft which are heavier and capable of carrying more and it seems like we just have a trend in that direction.

I guess that some of the ground vehicles that they might be called upon to carry are heavier than ever before. The jeeps are bigger than they used to be. There is an HMMWV jeep which is substantially larger as I understand it than what you previously had.

Is that an accurate description, this trend toward heavier and heavier ground equipment and heavier and heavier aircraft to carry them?

If it is an accurate trend, is it a good one?

General **Fitch**. Of course when we have to be prepared to address a threat normally that means increasingly complex requirements as we move along.

In the case of the vehicle that you are talking about that is a high mobility multipurpose wheeled vehicle which will be introduced in 1985. This vehicle weighs about 8,000 pounds. The JVX and the CH-53E will be the only two aircraft in the Marine Corps capable of carrying that vehicle, presently only the CH-53D and CH-53E have this capability.

HEAVIER AND HEAVIER EQUIPMENT

Senator **Bingaman**. I understand the value of getting the new technology, but is it a good trend to see us going to heavier and heavier equipment in these areas?

Do you have to do that as part of the introduction of the new technology?

General **Fitch**. The weight per se I don't think is a significant factor in the sense of a heavier and heavier vehicle, but the capability to lift heavier loads is in fact correct. That is what we did with the 53E. That is what we will do with the JVX.

For example, if the JVX does not come along, we are going to have to look at probably more CH-53E's to handle amphibious assaults because of the equipment we would have to lift.

Senator **Bingaman**. I just wonder if we should not be looking at designing equipment which would not require such heavy lifting capability by aircraft, some of the jeeps and other types of equipment that you are having to pick up, I don't know, maybe it is wise.

It just seems to me that you have an upward spiral. As you make heavier ground equipment, you have to have heavier aircraft to pick them up. You are bound to lose something in that process.

General **Fitch**. General Glasgow can speak more accurately about the mobile vehicle, but it in fact replaces several vehicles in the ground force.

MOBILE VEHICLES

General **Glasgow**. For us in our inventory, 14,000 of these replace 26,000. By having the same engine, the same design, same drive chain within this same system, it will considerably reduce the maintenance requirements that have been choking us to death.

Senator **Goldwater**. I might tell you that this is not an aircraft that is designed because of military requirement or even military request. It was designed by Bell Helicopter, built by Bell Helicopter.

In fact, nobody thought it would work. It went to the Paris air show a few years ago and it took the show. It is an application of Sikorsky's first principles of helicopter lift. It not only goes straight up and straight down, but cruises around 300 miles an hour.

So, the services began to look at it. I have to say they didn't immediately look at it. They took a little nudging. It is not something that the services embraced immediately, which they sometimes do.

As I say, I think it is the greatest advance in aviation that we have had in many years. It can be of extreme help to the services. Whether it can be used in an attack mode, we don't know, but it surely can provide a lot of lift fast.

The maintenance on it so far has been very, very low. It is something we want to get and we want to watch.

Senator **Bingaman**. Thank you.

General **Fitch**. Any further questions?

Senator **Goldwater**. Gentlemen, I have to go to an intelligence meeting. I will ask the Senator to continue the meeting. I think we can finish your portion around noon. If you do, whenever we finish and the staff finishes their interrogation, we will recess until 2 o'clock and come back and get on with the ground portion.

I apologize.

General **Fitch**. In the development program we are looking for the first flight of full-scale development aircraft in fiscal 1987. The initial delivery of this aircraft, as I mentioned earlier, for the Marine Corps would be delivered with the T-64 engine. Fiscal year 1993 and subsequent deliveries of this aircraft should be with the modern technology engine.

XV-15

The XV-15 which the chairman mentioned was in design and development by Bell Textron. This aircraft has been successful as a technology demonstrator. We feel it clearly demonstrates that this technology can be scaled up to the JVX design we require.

Senator **Bingaman**. That is the closest thing you have to the JVX?

General **Fitch**. Yes, sir. This aircraft has been flying quite a while. Senator Goldwater has flown it, I have flown it, as have many people in this room. It fairly, in my view, demonstrates the tilt rotor technology is the way to go in the follow-on medium range assault helicopters.

AV-8B

Senator Bingaman, this is the AV-8B shown carrying 16 MK-82 bombs. This aircraft on a tropical day is capable of taking off in 1,200 feet with this ordnance load.

We discussed earlier the AV-8A which is the aircraft that we have currently operating in the Marine Corps. We have had the AV-8A in active service since 1971.

[Chart deleted.]

You will see the AV-8A outlined in blue and the changes to the AV-8B are the other outlines. The AV-8B is slightly longer. It has about 5 feet more wing span. We have moved the outriggers inboard for better suitability in road operations. You can see that the vertical stabilizer is slightly extended.

Admiral SEYMOUR. This aircraft procurement will be fixed price incentive. In other words, it is not firm fixed price. It is fixed price with a target above which there will be a share line.

[Chart deleted.]

General FITCH. This shows the comparison of the canopies of the aircraft on the right as well as the frontal area of the aircraft on the left.

You will notice the AV-8B has a raised canopy for better visibility on the part of the pilot.

AV-8B—MARINE CORPS REQUIREMENT

Light attack (VMA) modernization: replace A-4M and AV-8A/C; 8 squadrons; benefits Reserve Forces A-4M to Reserves.

Provides responsive close air support to ground commander: Timely response due to basic concepts; located near forward edge of the battle area (FEBA).

Tactical flexibility and mobility: Ground support requirements minimized.

Fiscal year 1984 submit: $1047.6M (32 ACFT); $98.4M (ADV PROC).

The aircraft is required for modernization of the light attack force for Marine aviation. It will replace three aircraft, A-4M, AV-8A, and AV-8C.

We plan to have eight active squadrons which is the same number of light attack squadrons we currently have. This program will also benefit the reserve forces because as we introduce the AV-8B in active service the A-4M Skyhawk will migrate to the reserves.

We feel strongly in Marine aviation that the AV-8B provides the most responsive close air support to the ground commander. This is based primarily on the basing concept that we used to employ this aircraft where we forward deploy it close to the troops who are going to need it.

The fiscal 1984 request is for $1,047,600,000 for 32 aircraft. This gets the unit flyaway cost down to $20.1 million. This request in 1984 also includes $98.4 million in advance procurement.

AV-8B—MARINE CORPS UTILIZATION (ROLE)

Basing options: Amphibious; forward deployment.

Effective close air support: Responsive; accurate; high sortie rate.

Utilization and basing options: This aircraft can be operated from amphibious ships such as the LHA, LPH, and LTH. It can also be forward deployed as I mentioned, with the troops operating on hard top roads, grass fields and pads made from aluminum matting.

Logistics support in our basing concept is very similar to what we do with the EA-6B where we provide detachment from the parent squadron as well as the RF-4B where we provide detachments from the parent squadron.

They are responsive to close air support requests. We believe a close air support target exists for 30 minutes and then it is no longer a valid target as a rule.

The aircraft will be extremely accurate in ordnance delivery. It has the angle rate bombing system utilized both in the AV-8B and the A-4M. The AV-8B is capable of a very high sortie rate. We have demonstrated in the case of the AV-8A that the aircraft can fly 10 sorties per day per aircraft on a surge basis and up to 6 sorties per day on a sustained basis.

The chairman asked that I address the OPEVAL. We have already touched on that briefly.

The operational evaluation—this is a quick look by the commander of the operational test and evaluation force conducted August 30 to October 8, 1982.

They did uncover quite a few deficiencies as they saw them. Most of those deficiencies have been corrected or are being corrected.

One primary deficiency that has caused us some concern was what I mentioned earlier, the specific excess power which translates as a problem when you are coming into a high threat area. At low altitude, with high G on the aircraft there is some air speed bleed off.

We don't have the production engine yet, but we do feel that the production engine, the Rolls Royce F-402-RR-406, will solve part of this problem. At the same time the contractor has a very dedicated drag reduction effort ongoing which hopefully will solve the other part of the problem.

We touched on mishap rate for the AV-8A earlier. I would correct one number that I gave you, Senator Bingaman, on the overall mishap rate for this aircraft over roughly a 12-year period—37.9 mishaps per 100,000 flight hours. In 1981 we did have six mishaps with this aircraft. In 1982 we had five.

I think it is also significant when you look at mishap rates for a small community of aircraft where in 1982 our mishap rate for 100,000 hours was 40.7. In the EA-6B we had a similar problem with yet another small aircraft community. In 1981 we had one mishap with that aircraft, yet the mishap rate for the entire year for the EA-6B was 18.1.

So, in 1981 in the EA-6B community had you had two mishaps, you would be talking on the order of 36 as your EA-6B mishap rate in the Marine Corps.

Senator BINGAMAN. You say you had five accidents in 1981, six in 1982 or vice versa?

General FITCH. We had six AV-8A mishaps in 1981 and five mishaps in 1982.

Senator BINGAMAN. In the AV-8B?

General FITCH. No, sir. This is strictly AV-8A.

Senator BINGAMAN. What about use of that plane in the Falklands? Was it used? If so, what was the result?

General FITCH. The Sea Harrier of the Royal Navy is somewhat heavier than the Marine AV-8A. The Royal Air Force's GRMK-3 is quite similar to the AV-8A. Both of those were used in the Falklands with the Sea Harrier operating from the ships, *Hermes* and *Invincible.*

We feel that the Sea Harrier was quite successful in the air-to-air role where it is generally credited with destroying 20 Argentine aircraft. We feel that the Royal Air Force was also successful in their role, although it was not as spectacular as the Sea Harrier because they had no air-to-air victories.

Senator BINGAMAN. I gather it was used somewhat in air-to-land type encounters?

General FITCH. Yes, both aircraft, as I understand it, were used in the air-to-ground role, but it was primarily the Royal Air Force GRMK-3 in the air-to-ground role.

They did operate ashore from an 800-foot aluminum strip on San Carlos and this was significant in that the sortie duration, or the time on station when they were operating strictly from the ships, was very brief because the ships were standing about 200 miles, as a rule, to the east of the Falklands.

Once they were able to operate ashore from the San Carlos strip they were a~~ble to e~~xtend their time on station significantly. What they would normally do is fly from the ship, conduct an operation such as air-to-air intercepts and land at San Carlos, refuel, rearm, conduct another mission, and then return to the ship.

By operating ashore we feel that they did go a long way to confirm the concept of ship and shore basing that the Marine Corps has for employing this aircraft.

[Chart deleted.]

This shows the AV-8A operating from a road. This is down in Cherry Point, N.C.

I would draw your attention specifically to the outrigger on this aircraft which happens to be about 22 feet between the outriggers. We have found that typical roads around the world are also about 22 feet wide. So in the case of the AV-8B we have corrected this and we have narrowed the distance between the two outriggers so that it fits the road more properly.

[Chart deleted.]

This shows the AV-8 refueling from a helicopter expeditionary refueling system. This is roughly a 500-gallon bladder of JP fuel. This also shows the AV-8A operating in a typical hide.

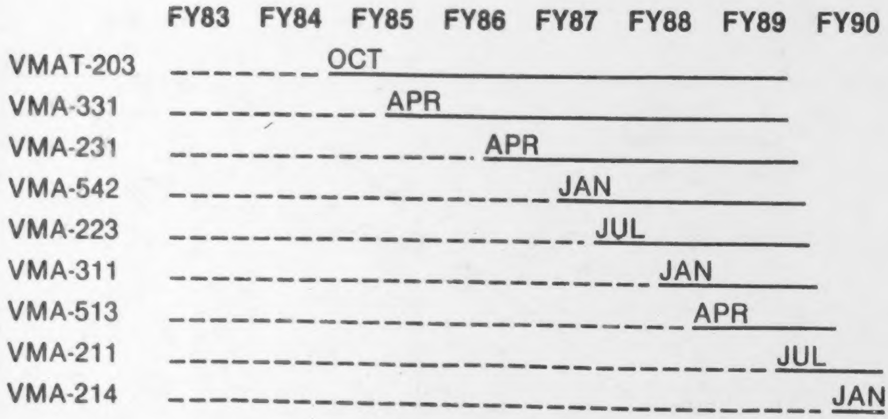
[Chart deleted.]

This is another view of the AV-8A as we would employ it in a dispersed operation.

[Chart deleted.]

This is a view of AV-8A's operating from the U.S.S. *Nassau,* an LHA.

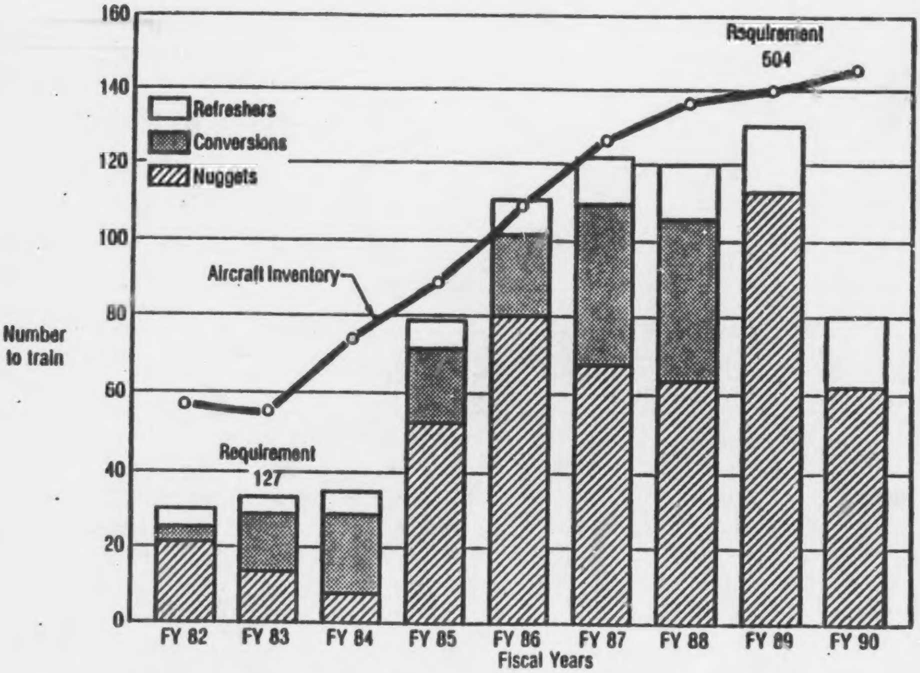
AV-8B TRANSITION SCHEDULE



This is our transition schedule for the AV-8B. VMAT-203 is our training squadron at Cherry Point. They will receive their first aircraft in October this year. VMA-331 was an A-4M squadron. They stood down as an A-4M squadron in January. They are now transitioning to the AV-8. They will stand up as an AV-8B squadron in 1985.

We then progress through VMA-231, VMA-542, both AV-8A squadrons. Then we return back to the A-4M transition with VMA-223, VMA-311. We complete the transition to an all V/STOL light attack force in 1990.

AV-8 Training Requirement Projections



This chart depicts why we need the TAV-8B, the two-place trainer which will be essentially the same as the new AV-8B.

We currently have a requirement in the Marine Corps for 127 AV-8 Harrier pilots. You can see in 1985 the requirement for training increases dramatically, up to nearly 80 for the year. Then by the year 1989 we have a requirement for a total of 504 AV-8 pilots in the Marine Corps.

TAV-8B

Marine Corps requirement: Transition: Conventional (A-4) light attack to V/STOL; trainer: $47.0M in fiscal year 1984.

Marine Corps utilization (role): Optimizes transition training; enhances all training results/flow; improved safety benefits; combat capable aircraft; growth potential: Future missions such as TAC(A).

We feel that the TAV-8B, the two-place trainer, is the way to go. It will provide for a more efficient and safe transition of A-4 pilots and more junior pilots into the V/STOL regime. We are requesting $47 million in RDT&E funds in 1984. These are in the budget.

The TAV-8B aircraft will optimize transition training in that it has essentially the same cockpit as the AV-8B and also the same flight characteristics. We feel that it will dramatically improve the safety benefits.

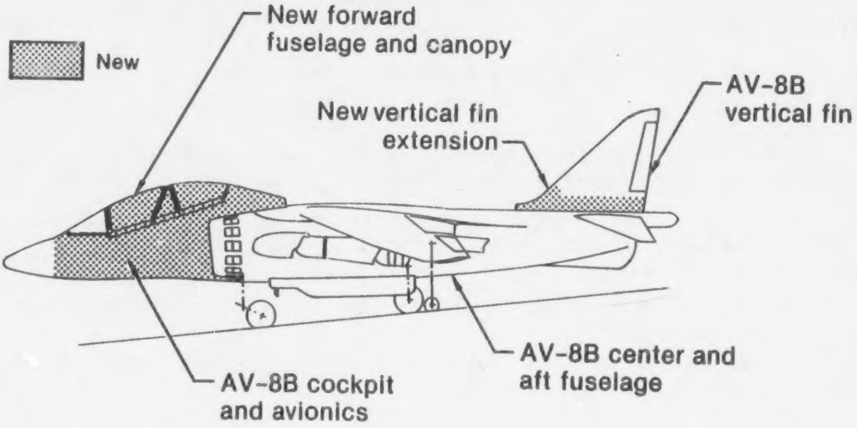
The AV-8B will also be a combat-capable aircraft and has growth potential for such missions as tactical air coordinator airborne [TAC(A)].

I should also like to mention that we do not plan any program growth in the AV-8B program by introducing the TAV-8B. We plan to trade off AV-8B's in order to have the TAV-8B and we plan to do it within the current program.

[Chart deleted.]

This is a VuGraph of the AV-8A cockpit compared to the AV-8B. The AV-8B is on your left. I think it would be fair to say that the AV-8B cockpit is very similar to the cockpit in the F/A-18.

TAV-8B
Changes Relative to AV-8B


▨ New
New forward fuselage and canopy
New vertical fin extension
AV-8B vertical fin
AV-8B center and aft fuselage
AV-8B cockpit and avionics

- 96% engineering drawings common to AV-8B
- 90% component commonality to AV-8B

This shows the change in the basic AV-8B in order to achieve a TAV-8B. You see the primary change is in the area to the front of the engine inlets where we have the second cockpit. There is also a slightly higher vertical stabilizer.

[Chart deleted.]

This is an artist's concept of the TAV-8B. Underneath the aircraft you will see what we refer to as LIDS, or lift improvement devices, which provides enhanced vertical take off and landing capability.

F/A-18

[Chart deleted.]

The next program, sir, is the F/A-18. In the Marine Corps we feel that the F/A-18 is an absolutely superb aircraft. We fully support it. We are completely satisfied with it, both in the fighter and attack role as well as with the range of the aircraft. The F/A-18 meets the Marine Corps requirements.

F/A-18—MARINE CORPS REQUIREMENT

Marine Fighter/Attack Modernization: Replace aging F-4; 12 squadrons; enhanced capabilities.

Multimission capable: Fighter mission; attack mission; escort role.

Fiscal year 1984 submit: $2,726.3 (84 ACFT).

It is going to replace the aging F-4, which was first introduced into the Marine Corps about 20 years ago. We have 12 fighter attack squadrons, these are VMFA's. It will be multimission capable because in the Marine Corps we require our fighter/attack squadrons to be capable of both fighter and attack missions. The fiscal year 1984 request is $2.76 billion for 84 aircraft.

I might correct a statement I made earlier when I gave total Marine requirement. I was in error by 11. The requirement is 476 in order to fully meet all the needs of the Marine Corps for active aircraft reserve pipeline and attrition.

F/A-18—MARINE CORPS UTILIZATION (ROLE(S))

Fighter role in amphibious objective area: Gain/maintain air superiority; figher attack escort (FAE).

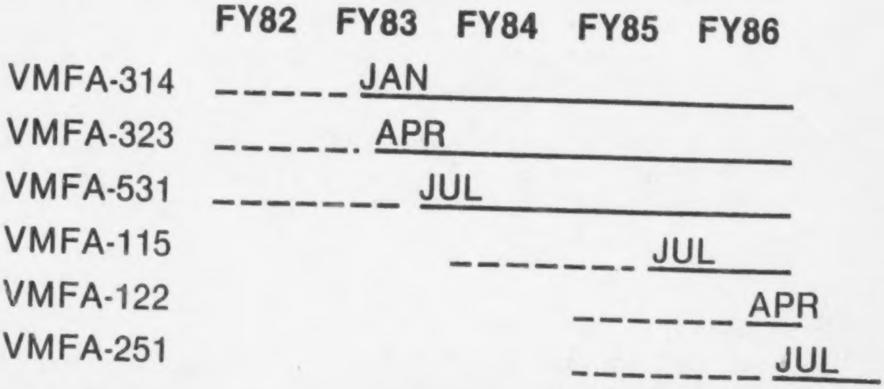
Close air support of ground forces: Day capable; night capable.

Tactical air control airborne (TAC(A)): Link to ground commander.

Utilization of the F/A-18 in the Marine Corps: First, of course, it will provide the fighter role in the amphibious objective area, not only to gain our superiority, but to maintain it. Then there is the fighter attack escort mission and F/A-18 in the strike role can also provide its own escort.

The F/A-18 is highly capable of close air support of ground forces, both day capable and night capable.

F/A-18 TRANSITION SCHEDULE



This is our transition schedule. VMFA-314 is currently at Marine Corps Air Station [MCAS] El Toro. They arrived in January of this year.

The 2d Squadron, VMFA-323, will arrive later this month or in early April. By midsummer we will have three F/A-18 squadrons operating at El Toro. We then move to Beaufort, S.C., in 1985 and

1986 with three more squadrons. We will stand up two squadrons of F/A-18's in fiscal year 1987 and then after that we will stand up at the rate of approximately one squadron per year.

[Chart deleted.]

This is the A-6E Intruder, the all-weather attack aircraft for both the Navy and Marine Corps.

A-6E

Marine Corps requirement: Medium attack; all-weather close air support capability; dual capable; fiscal year 1984 submit: $232.3M (6 ACFT).

The Marine requirement is for medium attack aircraft capable of all-weather close air support, dual capable in that it can do both the all-weather attack missions as well as the visual mission. In 1984 the request is for $232.3 million for six aircraft.

A-6E

Marine Corps Utilization (role): True all-weather CAS capability: Day or night; RABFAC beacon capable; conventional and nuclear capable.

Close in all-weather interdiction: Day or night; improved capability with Tram system.

Significant in this aircraft for Marine application is the all-weather capability and in that regard it is working with what we refer to as radar beacon forward air control, or RABFAC is the acronym, where we have demonstrated in combat the capability of this aircraft in all-weather conditions to provide close air support within 100 meters of troops.

Senator BINGAMAN. How many of these do you have?

General FITCH. We have 5 tactical squadrons each with an authorized allowance of 10 aircraft each. We have come down significantly in recent years.

If you went back to 1971, we had 6 tactical squadrons each with 12 aircraft. We then went down to 5 squadrons in 1972 and in 1978 we reduced the authorized aircraft in those squadrons from 12 down to 10.

We are currently operating 50 aircraft in a tactical mode plus aircraft in the training squadrons.

Senator BINGAMAN. Based on the current request and the projected request, we are really phasing this aircraft out? We are losing them faster than we are replacing them? Is that accurate?

General FITCH. I will give you our mishap rates for the last 2 years, Senator. In 1981 the Marine Corps lost one A-6E. That gave a mishap rate of 4.1 per 100,000 flight hours.

In 1982 we lost two and that gave a mishap rate of 8.2 for 100,000 flight hours.

Senator BINGAMAN. I guess there will be six constructed this year?

General FITCH. Six aircraft requested.

Senator BINGAMAN. All for the Marines?

General FITCH. No, sir. Most of those aircraft, in fact, I would say all, are for the Navy because they will be Harpoon capable and the Chief of Naval Operations has a requirement that the Harpoon capable aircraft go aboard ship until they have the capability throughout the carrier battle groups.

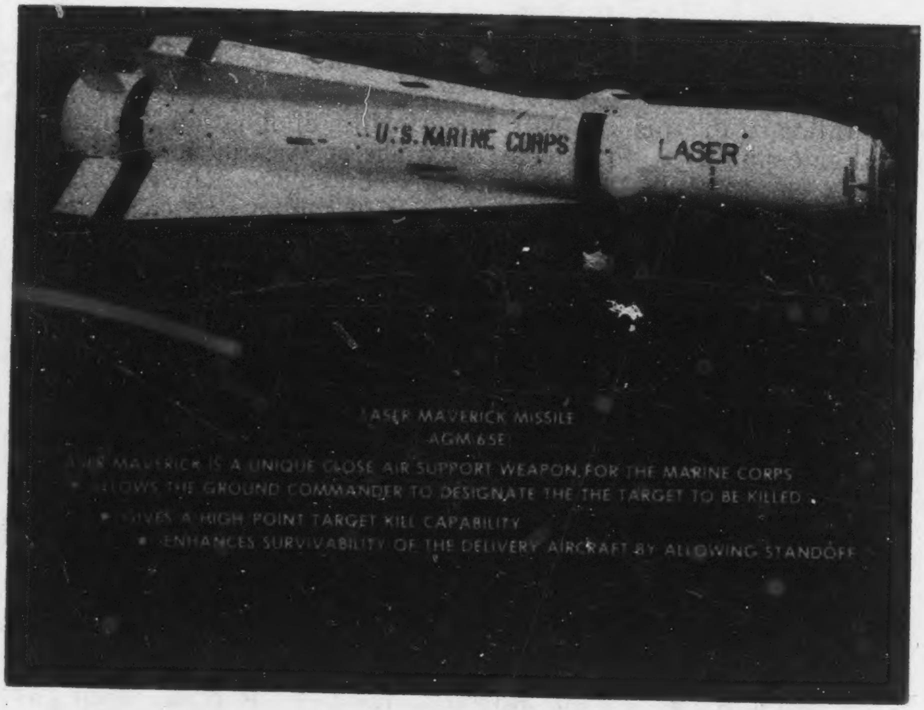
Senator BINGAMAN. The ones you lose are not being replaced?

General **Fitch**. Yes, sir, they are replaced, but they are replaced with older aircraft which have been previously procured.

In 1982 the Marine Corps had a mission capability rate for this aircraft of 72 percent, full mission capability of 60 percent. That is based on the 24-hour clock.

> April 15, 1982.—The A-6E, with its fine all-weather capability is the ground commander's most reliable attack vehicle at night and during periods of reduced visibility.—R. H. Barrow, General, U.S. Marine Corps.

This statement I believe properly identifies the requirement for this aircraft in Marine aviation when the Commandant on April 15 last year said "The A-6 with its fine all-weather capability is the ground commander's most reliable attack vehicle at night and during periods of reduced visibility." I would add that a week ago on March 8 at the Senate Appropriations Committee he reaffirmed that statement.



LASER MAVERICK MISSILE
AGM 65E

LASER MAVERICK IS A UNIQUE CLOSE AIR SUPPORT WEAPON FOR THE MARINE CORPS
- ALLOWS THE GROUND COMMANDER TO DESIGNATE THE THE TARGET TO BE KILLED
  - GIVES A HIGH POINT TARGET KILL CAPABILITY
    - ENHANCES SURVIVABILITY OF THE DELIVERY AIRCRAFT BY ALLOWING STANDOFF

Next, I will discuss a very significant weapon capability that we feel very strongly about in the Marine Corps. This is the laser Maverick. This is a missile which will allow the ground commander to designate the target to be killed, whether it be armor as a target, a pillbox or some other protected position.

The key to the laser Maverick is that it will allow these very expensive aircraft we have been talking about to survive in a high-threat area.

LASER MAVERICK—MARINE CORPS REQUIREMENT

TACAIR, anti-armor capability; stand off, laser guided, inflight fuzing/coding; ground or air designated—responsive to ground commander; increased survivability in CAS role; fiscal year 1984 submit: $46.8 million.

The Marine Corps requirement is both for an antiarmor capability, standoff in antiarmor capability, as well as the capability to destroy such targets [deleted] such as you would find in North Korea. These are heavy artillery positions with protected doors several feet in thickness, and made of reinforced concrete.

The missile has a standoff capability, and is laser guided. It has an in-flight fuzing capability as well as coding for the laser and selectable fuzing, either instantaneous, medium, or long. In the case of a reinforced concrete door which we do find in many target areas around the world, this missile will penetrate 2 feet of reinforced concrete and then with the longer fuze setting it will detonate approximately 28 feet on the other side of that door. It is responsive to the needs of the ground commander. It does provide for increased survivability and in 1984 we are requesting $46.8 million.

LASER MAVERICK—MARINE CORPS UTILIZATION (ROLE)

Effective CAS: Supports ground commander's desires, optimized for CAS environment.

Delivery platforms: F/A-18 and AV-8B compatible at production, A-6E and A-4M to be modified to carry.

OPEVAL (OT-11A): 15 of 15 successes; air to ground designated: OV-10, A-6E; mule.

Marine Corps utilization is to support the ground commander as he desires, optimized for the close air support environment. I would now draw the distinction between I^{2}R Maverick and laser Maverick.

The I^{2}R Maverick is a missile which homes on an infrared signature and the key there is that the I^{2}R Maverick can't tell the difference between a friendly tank and enemy tank. When you are in close contact that becomes a very important point.

The laser Maverick is optimized for the close air support environment. I would add that the U.S. Marine Corps is the only customer for this weapon which again I think is indicative of our priority for close air support.

The F/A-18 and AV-8B will be compatible with delivering the laser Maverick off the production line. We plan to modify the A-6E and A-4M to carry this missile.

We conducted an operational evaluation in which we had 15 missile firings with 15 successes. The targets were designated by both air and ground designators. The air designators were the OV-10D and A-6E Tram.

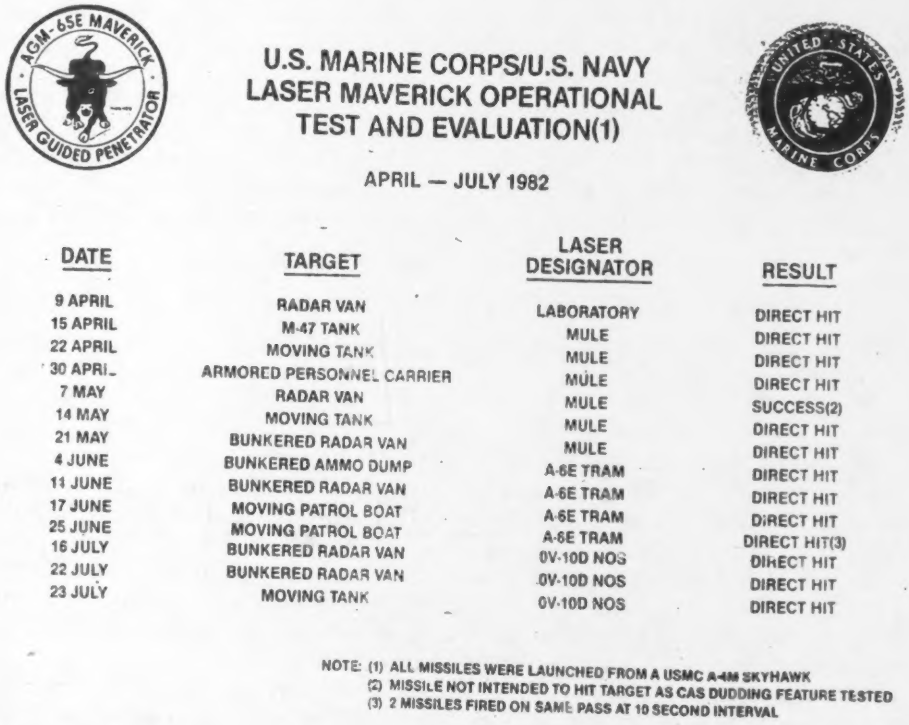
The ground designator was the MULE which refers to modular universal laser equipment. These 15 shots were from a modified A-4M against both moving and stationary targets and land and sea targets.

We had missile firings in smoke and dust. We had false targets identified by spurious laser designators. We also conducted firings with electro-optical countermeasures in being.

The operational effectiveness of this missile: First pass attack to the entire system, this is the aircraft and missile, laser designator, [deleted]. Probability of hit, [deleted]. Probability of hit in an electro-optical countermeasure environment, [deleted]. Probability of mission success, [deleted]. Availability of missile, [deleted].

The reliability of the missile after a captive carry for 2 hours, [deleted]. Reliability of the missile after captive carry for 10 hours, [deleted]. Average lock-on range, [deleted] nautical mile range. Average launch range, [deleted] nautical miles.

And it is significant we had six shots conducted at 520 feet above the ground or less.



U.S. MARINE CORPS/U.S. NAVY
LASER MAVERICK OPERATIONAL
TEST AND EVALUATION(1)

APRIL — JULY 1982

DATE	TARGET	LASER DESIGNATOR	RESULT
9 APRIL	RADAR VAN	LABORATORY	DIRECT HIT
15 APRIL	M-47 TANK	MULE	DIRECT HIT
22 APRIL	MOVING TANK	MULE	DIRECT HIT
30 APRIL	ARMORED PERSONNEL CARRIER	MULE	DIRECT HIT
7 MAY	RADAR VAN	MULE	SUCCESS(2)
14 MAY	MOVING TANK	MULE	DIRECT HIT
21 MAY	BUNKERED RADAR VAN	MULE	DIRECT HIT
4 JUNE	BUNKERED AMMO DUMP	A-6E TRAM	DIRECT HIT
11 JUNE	BUNKERED RADAR VAN	A-6E TRAM	DIRECT HIT
17 JUNE	MOVING PATROL BOAT	A-6E TRAM	DIRECT HIT
25 JUNE	MOVING PATROL BOAT	A-6E TRAM	DIRECT HIT(3)
16 JULY	BUNKERED RADAR VAN	OV-10D NOS	DIRECT HIT
22 JULY	BUNKERED RADAR VAN	OV-10D NOS	DIRECT HIT
23 JULY	MOVING TANK	OV-10D NOS	DIRECT HIT

NOTE: (1) ALL MISSILES WERE LAUNCHED FROM A USMC A-4M SKYHAWK
(2) MISSILE NOT INTENDED TO HIT TARGET AS CAS DUDDING FEATURE TESTED
(3) 2 MISSILES FIRED ON SAME PASS AT 10 SECOND INTERVAL

These, Senator, are the laser Maverick test results and all firings were successful.

Senator BINGAMAN. Let me interrupt so that I don't forget it. Could we get a Xerox or a copy of the various slides that are being used this morning so that we will have that to refer to?

General FITCH: Yes, sir.

Senator BINGAMAN. Some of these you have a lot of information on and I for one can't read it all before you change slides.

General FITCH: Yes, sir.

Senator BINGAMAN. I would appreciate that.

General FITCH: We will provide that. I mentioned that laser Maverick is not just an anti-armor missile. This VuGraph [chart deleted] shows a reinforced concrete door such as you would find in North Korea in significant numbers. This particular door was 2 feet thick, reinforced concrete. You can see the missile just about to impact. [Chart deleted.]

This shows the results of that impact where the missile penetrated the door, went approximately 28 feet on the other side and detonated. This was the long fuse option. I do mention again that that fusing option is available in flight.

Senator BINGAMAN. How does the ground unit designate a target for this missile attack? How do they go about that?

General FITCH. We have a ground designator which weighs approximately 42 pounds. It has a tripod mounting. That weight includes the tripod. This is what we refer to as the MULE, modular universal laser equipment.

It just finished development and is going into production. The Marine Corps' plan is for 380 of these ground laser designators. You can designate the target, both with the designator mounted on a tripod or you can remove it from the tripod and hold it up to your shoulder as you would a rifle.

The designator is capable of designating a stationary target at about 3,500 meters, a moving target at about 2,500 meters. That takes care of most of the targets that the ground commander or forward air control party would find in his immediate area. Of course, in addition to the ground designator you have the airborne designator, the A-6 TRAM and OV-10D.

Senator BINGAMAN. Thank you.

General FITCH. Next I will touch on the Marine Reserves. This is the aircraft capability assigned to the 4th Marine Aircraft Wing headquartered in New Orleans. We have two Marine fighter attack squadrons operating the F-4N aircraft in the reserves.

MARINE RESERVES (4TH MARINE AIRCRAFT WING)

Current status: 2 fighter/attack (VMFA) squadrons (F-4N); 6 light attack (VMA) squadrons (A-4E/F/M); increased contingencies during active force modernization; aging aircraft, A-4E/F, F-4N.

We have four light attack squadrons operating A-4E, F and M aircraft. In recent years, because of our transitioning to the F/A-18 with three squadrons at El Toro and our planned introduction of the AV-8B, the role of the reserves in active actual contingencies has taken on more significance. We now find F-4N's in the 4th Marine Air Wing assigned to execute contingencies which normally would have been assigned to the active force.

The reserves do have aging aircraft in the A-4E and A-4F. The A-4M will replace those. The F-4N will be replaced by the F-4S as we place more of the F/A18's in theactive force.

MARINE RESERVES—(4TH MARINE AIRCRAFT WING)

Modernization enhancements: Light attack (VMA): 6 A-4E/F squadrons; transition to A-4M; increased capability, readiness; first A-4M's now at NAS South Weymouth, available for FMFLANT contingencies.

KC-130T: Result of Congressional Action; 4 aircraft November-December 1983; 2 Aircraft fiscal year 1983 procurement.

Modernization then of four light attack squadrons. We are also introducing the KC-130T for aircraft in November and December of 1983.

RESERVES

Modernization/enhancements: UH-1N-One squadron; AH-1J: One squadron (NAS Atlanta), 8 of 24 aircraft assigned, builds to 24 as active forces receive AH-1T; CH-46E: Two squadrons (current year 1982-83), Drop to one squadron in 1988; CH-53A; One squadron, additional CH-53D squadron in 1987.

UH-1N, we have one squadron. No changes are currently planned for replacement of the UH-1N. We have that squadron split between South Weymouth, Mass., and New Orleans.

AH-1J relates to a program I mentioned earlier, AH-1T attack helicopter. We only have eight of those aircraft in our inventory with the reserves now. As we are able to buy more AH-1T's and introduce those in the active force our older AH-1J's in the active force will migrate to the reserves.

CH-46E, we have two squadrons. In 1988 that will be reduced to only one squadron because we have to take those CH-46E's from the reserves, bring them back in the active Marine Corps because of the shortage of that particular aircraft in the active force.

CH-53A, we have one squadron. We are looking at introducing the CH-53D into the reserves in 1987 to replace a 53A squadron. Then in 1988 we will add a second CH-53D squadron, again aircraft transferred from the active force to replace the 46E squadron that we removed.

MARINE AVIATION IS READY

In summary, Mr. Chairman, I can say that Marine aviation is at its highest level of readiness that I can recall in my 31 years of active duty.

Senator BINGAMAN. Thank you, General.

Did you have some questions, Senator Warner?

Senator WARNER. Yes; I will be happy to participate in this.

I have to think about that: Thirty-one years, it is the best it has ever been.

General FITCH. That is 31 years in the Marine Corps. I had another year and a half prior to that, sir, at flight school.

Senator WARNER. I thought we did pretty well in Korea.

F-14

Let us go to an issue that has been of great interest to me for many, many years. That is the F-14.

Admiral, let us go back historically. When I was privileged to be with the Department of the Navy we laid out a program to buy 39 of the F-14A's with the full intention at that time of shifting to the B. We planned a new avionics system by the seventies and neither of those objectives was realized.

Now, as we get into the eighties and the F-14 continues to be one of the mainstays of naval aviation, I would like to have an updating on those two issues.

What about the program to move forward with both the B engine upgrade and avionics package?

Admiral SCHOULTZ. Senator Warner, we have a plan, a program. We are looking, of course, at the Air Force engine competition to see which would be the proper engine to put in that aircraft. It looks like when the competition is completed we make the choice.

Probably 1987 will be the first time we can put the engine changes in. That does not sound very good when we started in 1972 to put a new engine in.

Senator WARNER. Amazing.

Admiral SCHOULTZ. As you know, they have flown a demonstration engine with the——

Senator WARNER. You might describe for the record the improvement in that envelope of performance because I have seen those statistics.

Admiral SCHOULTZ. I am not sure I can recall them all.

Senator WARNER. Put them in the recaord.

Admiral SCHOULTZ. I can put them in the record.

[The information follows:]

F-14 ALTERNATE ENGINE

In 1981 and 1982 the U.S. Navy conducted an F-14/F101 Derivative Fighter Engine (DFE) Limited Development Program at Grumman's Calverton Facility. Objective of the program was to demonstrate operability/compatibility improvements, potential for improvements in engine durability, and increased qualitative performance. Limited test instrumentation was installed in the test aircraft.

Results of the Limited Development Program were outstanding. Unrestricted throttle movement was demonstrated throughout the aircraft envelope. Afterburner lights were smooth and the engines were smokeless.

Results of the Limited Development Program, compared to the TF-30-P-414A engine, are summarized by major area of interest and are provided for the record.

COMPARISON OF F-14/F101 DFE LIMITED DEVELOPMENT PROGRAM AND TF-30-P-414A ENGINE BY MAJOR AREA OF INTEREST

	F101 DFE	TF-30-P-414A
Operability: Throttle movement	Unrestricted throughout envelope	No throttle movement allowed in stall prone regime.
Reliability: Mean time between unscheduled maintenance actions.	75-100 hours	35 hours.
Maintainability:		
Maintenance man-hours per flight hour	1.0	1.5.
Engine trim required	No trim	Retrim after fuel control change/engine repair.
Durability:		
Hot Section Life	1,500 hours	550 hours.
Depot Repair Interval	4,000 hours	2,200 hours.
Rotor LCM	4,000 hours	4,000 hours.
Performance:		
Aircraft thrust to weight spec fuel	.749 to 1:1.99 lbs. per hour; lbs. thrust	.562 to 1:2.78 lbs. per hour; lbs. thrust.
Thrust (max A/B)	28,500 lbs.	19,900 lbs.
Thrust (IRT)	16,800 lbs	12,350 lbs.

Senator WARNER. Just generally there is an upgrade in the performance?

Admiral SCHOULTZ. Absolutely. The great thing it does is [deleted].

You can move the engine control and use them as a part of the aircraft whereas with the current engine you must [deleted].

Senator WARNER. Twenty-five to thirty percent improvement?

Admiral SCHOULTZ. Yes, sir, in thrust. In certain ranges in maneuverability and capability to operate the aircraft it is greater than that.

Senator **Warner**. What about fuel?

Admiral **Schoultz**. The fuel specifications are better.

Senator **Warner**. You have to wait until 1987?

Admiral **Schoultz**. To put them in the airplane. Hopefully they will start buying them before that. The problem is trying to get everything underneath the tent money-wise. We hope we have a balanced program.

We would like to get the program signal processor which allows for longer range, better identification of targets, more targets on the screen, but that is in 1984, the engine in 1987, the avionics upgrade in 1989–90.

We have not developed that plan in detail yet, but that is the way it is looking now, sir.

Senator **Warner**. I would like to have the Secretary of the Navy provide me with a program for upgrading that airplane in a period shorter than 1987.

If it is fiscal considerations, then we can address those here in the Congress. If it is conditional funding for R&D, likewise we can address that here in the Congress.

From my own point of view, I think it is unacceptable to have a program that was initiated back in the early seventies and still be not fulfilled here in the eighties.

I want to get to the bottom of this thing and see if we can move it along.

Admiral **Schoultz**. I don't know whether the engine development could be accelerated much. We can find that and get it for you and see if we could move it up. There is an integration problem with the aircraft. They have to put a plug in the after part as you know.

There is a cost involved in that. The R&D cost of the entire program is quite high and that is really one reason we spread it plus the fact to put it all in at one time would be an awful large change in the aircraft.

I will see if I can develop an improved program.

E–2C

Senator **Warner**. Turning to your early warning aircraft, E–2C, it seems to me that that aircraft is getting retired in some respects, is it not?

Admiral **Schoultz**. Yes, sir. We have been upgrading it. We have improved the radar. By the end of 1986 we will have all the upgraded radars. We are improving the radar called TRAC–A which will expand the range and improve the ECM capability. There is a program called I^2 CORE which is a high-speed processor that handles a lot more radar information and programs.

That is part of the increased cost in the E–2C this year to put that high-speed processor in the airplane. We will have two squadrons of TRAC–A at the end of 1983. All of the Pacific Fleet will be switched to ARPS conversion which is a moving target and other capabilities by 1986.

I think we are doing pretty well with that airplane, Senator, in upgrading it. We are still continuing to buy it. Each year the product is improved. We have done a lot for the radar. That is the most impressive airplane I have been in for a long time.

With the new ECM capability, I have watched it operate at sea and it is very popular. The Israelis had very good luck with it in their operations. Several different countries are looking at it now.

In the bog down testing we had problems with the test. The bog down test is complete. The engineers think they have found the reason for that and they are making changes in the engine.

A-6

Senator WARNER. Let us turn to the A-6 program.

It is my understanding you have covered most of that. I will just ask these questions.

If you wish to contribute more for the record or here in this oral hearing, feel free.

There is still controversy about this production line. Do you support continued production of this aircraft?

Admiral SCHOULTZ. Yes, sir. It is needed to complete our inventory. We have a continual requirement for the aircraft as we expand the forces. If we were not expanding the forces, but contracting, we wouldn't have the requirement.

As we go to the 13th and 14th air wings we need to continue buying the aircraft.

General FITCH. We should continue production, Senator.

Senator WARNER. Is there any requirement for upgrading in the AE-6E?

Admiral SCHOULTZ. Yes, sir. We made the TRAM improvement in the FLIR and laser spot tracker capability of that aircraft. We do in the long term need to improve the avionics in it, improve the radar. We have a program that we are proposing for this continual upgrade for the airplane.

We decided to keep the F-14 and the A-6 in the inventory instead of buying the VFMX because the VFMX was too expensive.

Senator WARNER. I am advised that the aircraft carrier *Kennedy* is going on deployment with only A-6 attack aircraft on board and into light attack planes.

Does this kind of deployment give you greater flexibility in meeting operational requirements and do your procurement plans provide you with sufficient A-6 aircraft to meet this flexibility?

Admiral SCHOULTZ. Senator, that is part of the air wing evaluation. We are doing the *Kennedy* with the F-14 and the A-6 primarily in an attack role. The *Constellation,* when she comes out of the yard next year, will have the A-6 and F/A-18 and F-14 and then the *Coral Sea* when she comes out of the yard will have an F/A-18 wing.

Those are the wings we are trying to evaluate. If it requires additional A-6E's in our air wing composition, we are going to need more A-6E's, it may be that we will need less, we need a complete evaluation to determine the mix.

The six a year barely keeps up with the attrition.

Senator Bingaman pointed out if we meet the predicted attrition rates, we will be short.

Senator WARNER. This is an important OPEVAL you have coming up on that.

Admiral SCHOULTZ. Yes, sir. At the same time we have an air wing study and it should be out sometime this spring which will give us some more information.

Senator WARNER. When is the deployment OPEVAL due to come in?

Admiral SCHOULTZ. That won't be for a couple years.

Senator WARNER. How can this manufacturer keep this dribble of a production line going for 2 or 3 years?

Admiral SCHOULTZ. We plan to buy six a year for the next 5 years.

We have the A-6 STOL demonstrator coming up which will be complete, I think, in another 1½ years which will give us another look at the A-6.

As I mentioned to Senator Goldwater earlier, if you shut the line down, you don't have the capability to surge, you don't have——

Senator WARNER. I am familiar with that. I just question the cost effectiveness of keeping it open for just six aircraft.

Admiral SCHOULTZ. It is not the most cost-effective buy. The more you buy, the cheaper the units will be.

Senator WARNER. The EA-6B line last year was used as a basis for helping to support the overall A-6 program, but on closer examination there is not that much relationship between those two production lines. They are quite distinct.

Admiral SCHOULTZ. Yes, sir. They are in the same line, as I understand it.

Senator WARNER. They are?

Admiral SCHOULTZ. Yes, sir.

Senator WARNER. If you think differently, put it in the record, but I am told they are separate lines.

Admiral SCHOULTZ. I have not visited the plant so I am not personally familiar. I had better go back and look.

Admiral SEYMOUR. I will check to make sure.

Senator WARNER. Of course, you only have 10 in a squadron now, isn't that correct?

Admiral SCHOULTZ. Yes, sir. In the A-6E.

Senator WARNER. In the Vietnam war you had 15 or 16 of them in a squadron.

How does that affect your——

Admiral SCHOULTZ. I think we had 12, Senator. Some of the squadrons have 14 because they will carry the four tanker versions with them.

Senator WARNER. Those are fine airplanes. I am hopeful that the Department of the Navy will continue to acquire them and in a manner that is cost effective.

Mr. Bingaman, do you have any further questions?

Senator BINGAMAN. Let me ask one question here.

How many aircraft are we proposing to buy in 1984 for carrier airwings? Is that figure readily available?

Admiral SCHOULTZ. I will have to figure out of my total buy which is 281 and find out which ones are airwing aircraft, Senator; 154 out of the total buy of 281, sir.

Senator BINGAMAN. How does that compare to the retirement and attrition that we expect in those carrier airwings? Is it more than enough to compensate for that?

Admiral SCHOULTZ. Overall, yes. Hopefully our attrition rate has gone down. It has been very helpful. Last year we had a 4.4-mishap rate per 100,000 hours. That is down dramatically from the previous year. As an example, in 1953 it was 51 mishaps per 100,000 hours.

So, our attrition rate is getting better, that is accidentwise. What we are running into is the block obsolescence. As the aircraft get older, you have to continue to upgrade them or buy new ones because they run into engine and airframe fatigue.

Even though we bring them back in and upgrade them, there is a continual reduction of older aircraft.

Senator BINGAMAN. What I am trying to get is whether we are acquiring or proposing to acquire aircraft for this purpose in quantities sufficient to build up to this 14-carrier Navy that we are looking at and 15-carrier Navy eventually?

Admiral SCHOULTZ. Yes, sir. We are planning to buy and have that in the budget to buy 14 full airwings. If attrition stays within the predictions, we will make our time in 1987.

The 15th wing will be a reserve airwing.

Senator BINGAMAN. By 1987 you expect to have 14 airwings?

Admiral SCHOULTZ. Yes, sir.

Senator BINGAMAN. Based on what you are buying?

Admiral SCHOULTZ. Yes, sir.

Admiral SEYMOUR. We lost 87 airplanes last year. We are buying 281. That is total. That includes noncarrier airplanes.

Senator BINGAMAN. Is there anything else?

Admiral SCHOULTZ. You remember not very many years ago we had greater attrition than we were buying. A lot of that was retirement because of age.

Senator BINGAMAN. Admiral, do you have anything else you want to say here this morning?

Admiral SCHOULTZ. No, sir. Unless you have further questions, that is our presentation.

Senator BINGAMAN. We appreciate your testimony. Thank you very much. Thank you, General.

Admiral SCHOULTZ. Thank you very much, sir.

We did not complete the answer that the chairman asked us on HARM. Would you like to discuss HARM quickly or would you rather have us come back?

Senator BINGAMAN. Could we cover that at 2 o'clock?

Mr. CARL SMITH. Senator Goldwater asked that we adjourn at 12 and meet at 2. We will reconvene at 2 o'clock.

[Whereupon, at 12 noon, the subcommittee recessed, to reconvene at 2 p.m., the same day.]

AFTERNOON SESSION

The subcommittee met, pursuant to other business, at 1:58 p.m., in room SR-232A, Russell Senate Office Building, Senator Barry Goldwater (chairman) presiding.

Members present: Senators Goldwater and Levin.

Staff present: James G. Roche, minority staff director; Robert S. Dotson, Carl M. Smith and James C. Smith, professional staff members; and Tamara L. Fransworth, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; Jan Kalicki, assistant to Senator Kennedy, and Ed McGaffigan, assistant to Senator Bingaman.

Senator GOLDWATER. The committee will come to order.

General Glasgow, you may proceed.

STATEMENT OF MAJ. GEN. HAROLD G. GLASGOW, U.S. MARINE CORPS, DIRECTOR, OPERATIONS DIVISION PLANS, POLICIES AND OPERATIONS DEPARTMENT, ACCOMPANIED BY VICE ADM. ROBERT F. SCHOULTZ, U.S. NAVY, DEPUTY CHIEF OF NAVAL OPERATIONS (AIR WARFARE); VICE ADM. ERNEST R. SEYMOUR, U.S. NAVY, COMMANDER NAVAL AIR SYSTEMS COMMAND; LT. GEN. WILLIAM H. FITCH, U.S. MARINE CORPS, DEPUTY CHIEF OF AVIATION; COMMODORE JOHN C. WEAVER, U.S. NAVY, F/A-18 PROJECT MANAGER; LT. COL. P. J. FINNERAN, U.S. MARINE CORPS, TACAIR OFFICER, AVIATION PLANS PROGRAMS AND BUDGET BRANCH; AND VICE ADM. ROBERT R. MONROE, U.S. NAVY, DIRECTOR, OFFICE OF RESEARCH, DEVELOPMENT, TEST AND EVALUATION

General GLASGOW. Mr. Chairman, I want you to know it is a privilege for me to be here and talk about our missions, our capabilities and some of the programs that we have now ongoing to enhance our readiness. I want to be right up front, sir, and say that we in the Marine Corps feel that on the ground side we are on the rise.

Things are pretty good out there now. Things that you see and hear on television about Lebanon are true, not only true, but are a good reflection on our services. We are all proud of soon to be Brigadier General Mead who is back out there now.

We are proud of the job he did with the forces that he has. But, it probably would be the same had those forces been from either one of the other MAF's that we have. We feel good about our people and the equipment that we have, sir.

As you know, sir, our primary function is amphibious warfare and the forces that we send out to the fleets are sent so that they are mission capable. In other words, they are task organized for the need at hand. For instance, the unit that is in Beirut now is a Marine amphibious unit. It has an aviation combat element and a ground combat element built around an infantry battalion. It also has a combat service support element along with it.

Had we anticipated that there would have been any hostility there we would have quickly sent a MAB. The Marine amphibious brigade is commanded by a brigadier general and has 12,000 to 16,000 people.

For a larger force for sustained operations ashore, we go to a Marine amphibious force built around a Marine division and aircraft wing. Its strength can go as high as 50,000 people.

I want to move now, sir, to some of the programs that we have that enhance the readiness of the ground component of our Marine air-ground team. I'd like to talk about the amphibious assault vehicle, the LVT, which is the workhorse in our Marine Corps. It is the vehicle that moves us from ship to shore and then serves as an armored personnel carrier once we are ashore.

We are deeply involved in a service life extension program that is designed to carry these vehicles on into the early or midnineties.

We are putting a new engine in the vehicle in the SLEP program. We are putting in a new all-electric weapon station on each of the vehicles, and rehabing the inside of the 984 vehicles.

In addition to the rehab, we also are procuring 329 new LVT's that will become a part of the maritime pre-positioning ships program.

We at this time have one brigade set of equipment aboard the ship that constitutes the near term prepositioning force located in the Indian Ocean.

Next year in August we will put our second brigade set of equipment out and in 1985 the third. Then in 1986 sir, we will replace the brigade set of equipment that is in the Indian Ocean at this time.

This gives us a considerable enhancement in our response time, sir. It cuts the response time from months to weeks. It is primarily a preemptive force, but together with our amphibious capability it will provide the Marine Corps with a capability that is second to none and is immediately responsive.

Of course, we have programs that are designed to increase both our firepower and mobility ashore now, sir. We have decreased the size of our infantry battalion from 913 to 822 almost 100 men. But while we have decreased it in size, sir, we have added 25 percent more firepower to this unit. It not only is more responsive and more firepower oriented but also much easier to man and control.

We will give them a new squad automatic weapon. We will give them a new individual rifle. I should not say new, it is an improved M-16, but we have done so many things to it that now it is equal to any rifle that any service has.

M-16

Senator GOLDWATER. Basically what did you do to that M-16?

General GLASGOW. We immediately went into the stock and the handguard and replaced those plastic parts with parts that now give the marine a feeling that he has a rifle in hand. We have extended the length of the stock. We increased the size of the barrel, making it a heavier barrel and in doing so we gave it a better feel and increased accuracy.

We increased the twist within the rifle barrel for better stability as well as better accuracy, and finally we put a sight on the back. Sir, this now gives the marine the feeling that he has a good weapon in his hand.

Senator GOLDWATER. The same caliber?

General GLASGOW. Yes, sir, the same caliber. It is a good rifle, sir. When the M-16 came on the scene it did have some problems, but it was new. Now it has been with us long enough that for the majority of our people, the only rifle they have seen and used has been the M-16.

If you turn around and check for comparison, we have more people who are saying that their rifle is a good as any they have ever had, sir.

Senator GOLDWATER. I notice you are using a 9-millimeter pistol.

General GLASGOW. We have a program underway, sir, to attempt to bring in a 9-millimeter pistol to replace the old caliber .45 pistol that we have carried since 1911. That program is currently out under a joint program in which the Marine Corps and the Army are attempting to look at candidates and determine which will be an acceptable weapon and then decide whether to procure it.

Senator GOLDWATER. Why do you as a combat man think that the pistol will do as well as the .45? The 9 millimeter will put a lot of holes in you, but it won't stop you.

General GLASGOW. I can't disagree with the fact that it won't sir. The .45 caliber was a good pistol and one that I think everyone was satisfied with, but the production lines are gone, and availability of parts has reached a point where our concern is now that the .45 can no longer be maintained.

The 9 millimeter was a decision that was made by the joint small arms program manager several years ago. The basis for that has been a subject of considerable discussion, as you are aware, sir, for a number of years.

Senator GOLDWATER. I think we have over 2½ million .45's that have never been used.

General GLASGOW. I will have to check that.

[The information follows:]

.45 CALIBER PISTOLS

The Marine Corps has an acquisition objective of 82,875 .45 caliber pistols. We currently have 58,779 .45 caliber pistols in the field of which 22,912 are unserviceable. The Marine Corps also has approximately 20,000 unserviceable .45 caliber pistols at Marine Corps Logistics Base, Albany, Georgia. These pistols were acquired from the U.S. Navy and are being inspected, then repaired or rebuilt if possible. If repair or rebuild is not possible the good parts are salvaged. The Marine Corps does not have on hand, quantities of .45 caliber pistols that have never been used and is not aware of any service that has an inventory of 2½ million pistols that have never been used.

Senator GOLDWATER. I wish you would because we have gone through a lot of hurrah, but going to the 9 millimeter. I'll be damned if I would want that BB gun.

With the .45 there is no argument about this piece. The 9 millimeter is more difficult to field strip, more difficult to keep operating. It might be a little more accurate for a few more yards. I know a lot of policemen use them and they don't like them. I thought we had gotten rid of the effort to get rid of the .45.

General GLASGOW. As you know, sir, we went through a program and went through eight candidate weapons back in 1980–81. None of them proved satisfactory. However, we were directed to continue to search and went back out with a request for proposal again.

Senator GOLDWATER. What are you looking for now?

General GLASGOW. I am not sure what the candidates are at this time. The issue is being studied at Aberdeen. I haven't seen any of the candidate pistols.

Senator GOLDWATER. For the sake of the young marines, I hope you don't get rid of that Colt. It is hard to hit anything from here to there, but if you hit him, he knows it.

General GLASGOW. In addition to those two weapons, we will have the shoulder-launched multipurpose assault weapon. We finally have a bunker buster, sir, that will knock a hole in the wall. That comes into the system as a replacement for our old 106 millimeter recoilless rifle. Since then, we have not had anything that would actually pop walls and tear up bunkers for us.

We have brought in additional .50 calibers that we are putting in each of the infantry bataliions. We will put the 40 millimeter MK-19 machinegun in, sir, which all marines I think now are looking forward to. This will kick out 350 rounds a minute out to 2,000 yards. And the 40 millimeter is effective against both armor and personnel. We feel real good about the firepower in the infantry battalion now, sir.

We are always mindful of the threat, sir, and have attempted to do a better job in our antiarmor world. We are bringing in additional TOW's. We are putting an additional TOW platoon in each of our infantry regiments weapons systems for each regiment, 24 in each division. It gives us a total of 144 TOW's in each division.

We have added 12 Dragons to each of our infantry battalions. They have gone from 24 to 36 in that area.

We are working together in a joint program with the Army to replace the light antiarmor weapon. We don't know exactly what that is going to lead to yet, sir. We are looking at several weapons. The answer is not here yet. We are still staying with the LAW [light antiarmor weapon] that we have and will until we have a satisfactory replacement.

MAIN BATTLE TANK

In the area of armor I wanted to just briefly mention our status as far as the main battle tank is concerned, sir. We have the M-60A1 and at this point in time we are trying to upgrade it, trying to improve it in any way we can to not only keep it with us for a longer time, but to make it as good a tank as we can. It satisfies the Marine Corps very well, sir. We are happy with the M-60. That is not to say that we have anything at all against the M-1.

It is just that I am not sure that the Marine Corps is going to be able to either buy or to maintain a tank that is any more expensive than the M-60, sir. We are looking at a number of rehab programs for it and hope to keep it on through the early nineties and at that time make a decision as to exactly what we will do.

We are also bringing in a unique family of vehicles this year in our light armored vehicle [LAV] program. We will have our first company aboard along about October or November at Twentynine Palms. We will test concepts out there from which we will determine exactly what we are going to do with the LAV, sir.

The initial procurement is strictly the LAV-25 or the light armored vehicle with a 25-millimeter Bushmaster. This huge chain gun in itself is a significant enhancement of firepower for the Marine Corps. It allows the company commander to have at his side substantial firepower where before he had nothing larger than a .50 caliber. This new weapon system will bring a target 2,000 meters away within range because the 25 millimeter can penetrate through both sides of our light armor at 2,000 meters.

We are also, sir, increasing our artillery capability. By the end of 1986 we will have most of our artillery battalions equipped with the M-198. There is no question that this is the finest artillery piece that the Marine Corps has ever seen. It is heavy and it is big, but we are learning how to handle it.

As we get more experience with it division by division we are managing to be able to handle it. It is helicopter transportable and allows us a considerable boost in that regard.

Senator GOLDWATER. Is the M-198 the 155 howitzer?

General GLASGOW. Yes, sir, it is a towed 155mm howitzer. It is new for the Marine Corps. It is the Army's artillery piece, sir.

Senator GOLDWATER. Have you looked at the Sergeant York gun that the Army is devloping?

DIVAD

General GLASGOW. We are looking at it, sir. That is the DIVAD, the air defense weapon that the Army has. I have no doubt, sir, that it is going to be a capable system, but we have to stand back and wait until we see the price tag on it before we can say whether or not it will fit our needs. At this point in time, sir, in addition to our Hawks, we are looking at putting Stinger teams in our light armored vehicles as our air defense capability, sir.

In addition to the mobility we talked about earlier, the HMMWV [high mobility multipurpose wheeled vehicle] will give us a new mobile weapons base for TOW, MK-19, and maybe a couple of other things.

It also gives us an all-round logistical vehicle as well, but the big thing is that we cut our present vehicle requirements by almost one-half. Our mechanics will now be able to work on fewer numbers and types of vehicle at all echelons of maintenance. This is a big advantage for us, sir.

We are also looking forward to introduction of the position locating reporting system [PLRS] which we hope to have on board by about 1987 or 1988. This, sir, will give us a command and control system with which we will be able to determine the location of helicopters, close air, ground units, and all the command posts, both in direction and distance.

Sir, these are our major programs. The others, that are included in our Marine Corps fiscal 1984 budget requests, are those that have been supported by this committee and sponsored by us and allow us to insure you that the Marine Corps is as capable as it has ever been. Through these programs we are going to be able to insure that we can do those things that are necessary to preserve and nurture the maritime strategy that we consider so essential.

[The prepared statement of General Glasgow follows:]

PREPARED STATEMENT OF MAJ. GEN. H. G. GLASGOW, U.S. MARINE CORPS

Mr. Chairman, distinguished members of the committee, it is a privilege for me to appear before this subcommittee. The Marine Corps is as capable and ready as it has ever been and I would like to express my appreciation for your support of our Corps. The Marine Corps' fundamental mission is amphibious warfare. Marine forces supporting the fleets are organized so as to be mission capable, that is, they are task organized. Task organization of forces permits us to build forces for a specific mission or mission area. We can then provide Marine Air Ground Task Forces (MAGTFs) that are hard-hiting, flexible and mobile. I would like to outline some of the programs that are designed to enhance the capabilities and maintain the readiness of the ground component of our Marine air-ground team.

Assault amphibious vehicles, the workhorse of the amphibious surface assault, reduce our vulnerability during the critical ship-to-shore movement and improve our mobility on the battlefield. The assault amphibious vehicle Service Life Extension Program (SLEP) is intended to extend the utility of the LVT-7 into the 1990s. In addition to an extensive rebuild effort, the SLEP will add many new systems and components. Among these will be a new engine, non-integral fuel tank, and all-electric weapons station. The first Marine unit to be equipped with the new LVT7A1 will be operational in fiscal year 1984. The program has two aspects, the SLEP of the entire inventory of LVT-7s of 984 vehicles and new production of 329 vehicles in the LVT7A1 configuration which will be used to support Maritime Pre-positioning ships program (MPS) and to meet Table of Equipment and Pre-positioned War Reserve Stock deficiencies.

In appreciation of the magnitude of threat armor, mechanized, and firepower capabilities, we are sponsoring programs to increase both our firepower and tactical mobility.

Our infantry battalion is now smaller, 822 men vice 913, with a 25 percent improvement in firepower. Firepower enhancements include additional .50 caliber machine guns; MK19 40mm machine guns; the Shoulder-Launched Miltipurpose Assault Weapon (SMAW), a powerful bunker buster; the Squad Automatic Weapon (SAW); our improved M16 rifle, the M16A2; and the 9mm pistol. A new 60mm mortar, the Lightweight Company Mortar System (LWCMS); and an improved 81mm medium mortar will also be added to our "cutting edge" of combat power, the infantry battalion.

To effectively counter armor and mechanized forces, several anti-armor enhancements are underway. Our heavy anti-armor capability for the assault elements has been improved by a new TOW platoon with 24 launchers which will be added to each infantry regiment. This will effectively double our heavy anti-armor assets within the division. The new TOW II with a 6" warhead, extended range, and improved capability against electro-optic countermeasures will be fielded in fiscal year 1984. Half of the TOW launchers will also have a night sighting capability by fiscal year 1985. In addition, our medium anti-armor assets, Dragons, will be increased from 24 to 32 per battalion. Half of these Dragons will be equipped with a night sighting capability beginning in 1985. We are participating with the Army in the Joint Light Anti-Armor Weapons evaluation program and the Marine Corps is seeking both a cost effective and capable Light Anti-Armor Weapon (LAW) that meets our requirements.

The M60A1, our main battle tank, will end its service life in the early 1990s; however, efforts are underway to either upgrade our present assets or to replace them with tanks providing enhanced anti-armor capabilities.

A new dimension will be added to the battlefield in fiscal year 1983 with the activation of the first Light Armored Vehicle (LAV) Company. This unit is the forerunner of a highly mobile, firepower intensive maneuver element which will be added to the Marine division and is unique because of its integrated combined-arms capability. These maneuver elements will be formed around a family of eight mission-role vehicles, all built on a common chassis. The light armored vehicles in each LAV organization will not only be strategically transportable but, when the situation dictates, helicopters will be able to move them deep into the enemy's rear area to seize key objectives.

In keeping with our proven doctrine of totally integrating our combined-arms effort, our artillery units will be strengthened by programs designed to enhance their effectiveness in general and, in particular, their anti-armor/mechanized capabilities. Introduction of the M198 155mm howitzer as our primary direct support artillery weapon significantly increases the lethality, range, and accuracy of our artillery units. Accuracy and lethality will be further improved by combining Copperhead precision-guided projectiles with the Modular Universal Laser Equipment (MULE). Additional 155mm self-propelled artillery will be added to the force, not only increasing the numbers of artillery pieces available but also providing additional mobility to support the fast moving aspects of the battlefield of the future and furthering our anti-armor/mechanized capabilities.

Our combined arms effort also requires control and logistics support to be successful on the battlefield and I would like to discuss some of the programs that are improving our total combat capability.

The High Mobility Multipurpose Wheeled Vehicle (HMMWV) is a new multi-functional vehicle which will streamline maintenance, training, and logistic support requirements. Functionally, it will serve as a weapons platform for the TOW and MK19 40mm machine gun, communications vehicle, and a multipurpose logistics carrier. Perhaps most significant are the cost efficiencies offered by this new family of vehicles. HMMWV will replace seven types of motor transport vehicles currently in the inventory and, by doing so, will virtually halve that inventory (26,000 current vehicles will be replaced by 14,000 HMMWVs) while simultaneously increasing tactical mobility. All variants will have a common chassis, engine and drive train which will contribute to our overall goals of simplifying or reducing operator maintenance training and logistics support requirements.

Successful military operations require that the commander and his assigned forces know their location and position in relation to other units at all times. This is presently determined by the use of a map and a compass with computations transmitted over busy tactical radio nets. The Position Location Reporting System (PLRS) is a tactical command and control system that provides accurate real-time position and identification information to the Marine Air Ground Task Force. PLRS will provide precise location and position information for friendly units and reliable battlefield navigation information under all conditions of visibility and weather.

The major programs which have been addressed and the other smaller, but equally essential, programs which are included in the Marine Corps fiscal year 1984 budget request will assure that the Marine Corps will continue to provide the nation with a ready, versatile, highly mobile combined arms force capable of rapid global response.

Mr. Chairman, we thank you for the opportunity to explain our programs before your committee and we thank you for your continued support.

Senator **Goldwater**. Thank you very much.

Senator Levin?

Senator **Levin**. I have some questions for Admiral Schoultz.

Senator **Goldwater**. Proceed.

READINESS

Senator **Levin**. Admiral, I have a few questions on some readiness items. Let me spend a few moments on those items.

First, on the aircraft spares and repair parts procurement figure, my understanding is that in the fiscal year 1983 budget we projected that we would put $2.5 billion in this year's budget, 1984, for the aircraft spares and repair parts.

Now it is instead down to $2.1 billion, which is 14 percent less than what we thought we would have in 1984 last year. Is that accurate?

Admiral **Schoultz**. Let me check the numbers, Senator.

I think that is pretty close. Yes, sir; those are pretty close.

Senator **Levin**. Why did you reduce that? That is a pretty significant reduction from what we thought we would have in there for spares last year.

Admiral **Schoultz**. It is an increase over last year, but it is not as large as we said we were going to put in. I am going to have to either take that for the record or let one of the spare parts people talk to that, Senator.

Senator **Levin**. Whatever is easier.

Admiral **Seymour**. You are correct on the $2.1 billion for this year.

Senator **Levin**. We have projected $2.5 for 1984?

Admiral **Seymour**. That is what I can't find.

Senator **Levin**. Would you supply for the record as to why that reduction from $2.5 to $2.14, assuming that is accurate?

Admiral **Schoultz**. Yes, sir.

[The information follows:]

The fiscal year 1984 spares budget in January 1982 displayed a requirement of $2,487 million. The fiscal year 1984 budget in January 1983 is $2,139.6 million, a reduction of $347.5 million. There was reduction of operating sites/platforms which caused a decrease in aircraft and engine spares requirements ($84.3 million) required for initial outfittings and a reduction in replenishment spares requirements ($263.2 million). The reduction in replenishment spares is mainly a result of a rebalancing of the total budget between aircraft spares and component rework which resulted in a decrease in the fiscal year 1984 budget for aircraft spares and in an increase in component rework.

DEPOT MAINTENANCE BACKLOG

Senator **Levin**. Now on the depot maintenance backlog, according to my figures it is projected to be about $240 million. Is that accurate?

Admiral **Schoultz**. If it is not, it is right up next to the number I have heard.

Senator **Levin**. Is that just a shortage of funds?

Admiral **Schoultz**. I think so, Senator, just in putting together a budget to get a balanced program.

Senator **Levin**. How about Navy flying hours on a per crew basis? Are they actually declining as I understand it in 1984 from 1983.

Admiral **Schoultz**. Yes, sir. Projection is that they will go down slightly. Of course, we have more aircraft and more crews as we are building up a new air wing. That again is a budgetary funding item.

Senator **Levin**. How much below the requirement is that? Do you know offhand?

Admiral **Schoultz**. We are asking for 82 percent of pilot primary mission readiness training, and we would like it to be at 88.

Senator **Levin**. What was it last year?

Admiral **Schoultz**. I am not sure, but I think it was 85.

Senator **Goldwater**. In our absence for a vote the staff will continue questioning.

Senator **Levin**. There are some reductions in readiness or failure to meet requirements even though readiness is your No. 1 priority. Is that a fair summary of where you are?

Admiral **Schoultz**. The flying hours requirement is probably not where we want it to be. Yes, sir.

Senator **Levin**. You have a backlog on depot maintenance of $240 million. You have aircraft spares below what we thought they were going to be last year. I understand that aircraft spares are 12 percent below requirements.

Is that an accurate figure?

Admiral **Schoultz**. I can't answer that, Senator. I will have to take that for the record. I am sorry.

Senator **Levin**. I am sorry. I can't expect you to keep all the figures in your head. I have them written down and they may not be accurate. My point is that even though readiness is your No. 1 priority, there are areas where you fall short on where you are projecting to be and where the requirements say we should be.

It seems to me that we ought to keep that clearly in mind as we allocate these dollars. As we divide them between the modernization and readiness accounts there are shortfalls in readiness. I don't think we ought to ignore them. You may want to argue that we ought to allow them to stay that way and build more ships instead, I can understand that, but I don't think we ought to ignore the fact that there are such shortfalls.

Admiral **Schoultz**. We are trying to balance the program between procurement and sustainability and readiness. We thought we made a fair guess at it. It is not ideal. We have learned there is a close relationship between flight hours and parts usage and maintenance backlog, and we try to balance that, we think we are going to find a savings in how we are doing that.

We made some changes in the depot level repair requirements. We used to schedule aircraft into depot just on time. Now we have decided we are going to take a look at every individual aircraft to see if it is a requirement that it goes in. It looks as though it is going to save us some money in the long run.

TACTICAL MISSILE PROCUREMENT

Senator **Levin**. How about procurement of tactical missiles? Are you able to look that up? According to the information I have, the 1983 projection for 1984 is that you will buy 4,795 missiles. The 1984 budget instead has 3,469, about 28 percent fewer.

Are you able to check that out?

Admiral **Schoultz**. All defense missiles, sir?

Senator **Levin**. Tactical missile procurement.

Admiral **Schoultz**. Air-to-ground, sir?

Senator **Levin**. All types.

Admiral **Schoultz**. Is that all inclusive?

Senator **Levin**. Yes.

Admiral **Schoultz**. I am going to have to take that because between AIM-9 and AIM-7, Harm, Harpoon, Phoenix, I will have to look that up.

Senator **Levin**. Will you give for the record what justification there is for that kind of reduction?

Admiral **Schoultz**. Yes.

Senator **Levin**. That is pretty severe. That is almost 30 percent below what we said we were going to buy just last year. Again the issue is not whether or not your balancing is correct. The issue is when we balance whether we are going to have in front of us what the facts are.

The facts are that we have made some cuts in what we projected we were going to do in readiness and do in sustainability. We have made some cuts in order to modernize. You may very well be right. We ought to make those cuts. That is not how I come down.

I come down on the other side. In order to know where to come down, we ought to look squarely in the face we are buying 1,326 fewer missiles than we said last year we were going to buy. That is something the Congress ought to know I think.

We ought to ask for an explanation as to why it is that we are reducing it by that much. So if you can supply that for the record, I will try to make this vote and see if I can catch up with my chairman.

[The information follows:]

AIR MISSILE PROCUREMENT

I will address those air launched weapons which are the responsibility of air warfare. The air warfare budget quantity was reduced by 22 percent from the fiscal year 1983 projection for fiscal year 1984 and the fiscal year 1984 request as you can see:

	Fiscal year 1983 budget, fiscal year 1984	Fiscal year 1984 budget, fiscal year 1984	Difference
Sparrow AIM-7M	400	374	−26
Sidewinder AIM-9M	450	350	−100
Phoenix AIM-54	360	290	−70
Harpoon AGM 84	150	177	+27
Harm AGM 88	250	230	−20
Hellfire AGM 116	195	219	+24
Laser Maverick AGM 65E	350	165	−185
IIR Maverick AGM 65F	180	0	−180
Total	2,335	1,805	−530

Sparrow—Reduction caused by OSD action to cut Navy and Air Force based on rate acceleration considerations.

Sidewinder—Reduced in order to provide funds for other Navy requirements.

Phoenix—Reduced by OSD to achieve a more reasonable production rate.

Harm—Reduction due to increased cost, driven by: (1) Greater than anticipated increase in labor rates. (2) Inefficiencies caused by the fiscal year 1980 gap in production. (3) Congressional reduction of $100.4M ($53.1M Navy, $47.3M Air Force) in the planned fiscal year 1983 HARM budget.

Laser Maverick—The USAF as executive service for the Maverick family of missiles has recently completed a repricing of fiscal year 1983/84 Laser Maverick procurement from preliminary contract proposals. This repricing resulted in a reduction of 185 missiles in fiscal year 1984. Chief of Naval Material Command has a cost study team reevaluating the proposals submitted by Hughes aircraft, and final figures should be available in July 1983.

IIR Maverick—The results of the initial operational testing will not be available in time to justify the fiscal year 1984 line shown in the fiscal year 1983 budget request. Therefore, the fiscal year 1984 request was reduced to zero with initial procurement to commence in fiscal year 1985.

Mr. CARL SMITH. At the request of the chairman, we will continue.

JVX PROGRAM

General Fitch, last week before the Senate Appropriations Committee Dr. DeLauer described the JVX program as being in a real mess.

Will you comment on that, please, and could you elaborate on whether or not you think that the program should proceed with a single contractor in the absence of competition. Also, would you specifically address the cost issue—the total estimate of program cost for both R&D and procurement, please.

General FITCH. Mr. Smith, first, I think the program should continue. As I said this morning, we are in a 23-month preliminary design phase. This is structured to minimize risk for this particular development and to give us all the necessary data for making a milestone II decision approximately 2 years from now.

As to the cost involved, we have a cost analysis which tells us in the Marine Corps what would have to be spent in order to provide an equal lift capability to what JVX promises to provide once it is introduced in the Marine Corps.

Looking at the requirement solely to carry 24 troops in the amphibious assault plus to have the capability to lift the high mobility multipurpose wheeled vehicle [HMMWV] and with our requirement for a total of 552 aircraft to meet the total program, we have a cost in 1983 dollars of $9.6 billion.

Mr. CARL SMITH. Is that for the total program? Does that include R&D and procurement?

General FITCH. That would be for the acquisition of those 552 aircraft and providing for the Department of the Navy's share of the aircraft and engine RDT&E.

The specific numbers on that would be $8.5 billion flyaway, a unit cost of $15.5 million and you would have RDT&E shares of $1.1 billion.

Now, if JVX did not proceed as planned, we would have to procure alternative aircraft in order to maintain the same lift capability. We estimate that using an H-60 as alternative, the capability to lift 11 troops in crashworthy seating as opposed to 24 for JVX, would require, through attrition, a total of 695 aircraft.

At the same time, in order to execute the capability that JVX has to lift the high mobility multipupose wheeled vehicle, it will require a total of 282 CH-53E's, including attrition, to meet that mission. But in this cost analysis what this gave us was for the H-60, counting $278 million for R&D, $6.1 billion for procurement, a total of $6.4 billion for the H-60 alone.

For the CH-53E, again to carry this high mobility multipurpose wheeled vehicle, a cost of $5.2 billion. In the aggregate $11.6 billion for the alternative.

The delta that you have is approximately $2 billion if JVX is not procured in order for the Marine Corps to complete its mission capability.

That, of course, is not the total cost. The H-60 would have to be aboard ship in larger numbers than JVX.

Mr. CARL SMITH. Why?

General FITCH. Because the H-60 will carry 11 troops compared to 24 troops in the JVX. We estimate somewhere between five and six LHD class ships would have to be built in order to carry those additional aircraft.

Mr. CARL SMITH. You would require five or six additional LST's?

General FITCH. LHD's. This is the follow-on to the LHA. In addition, in order to man the H-60E and CH-53E aircraft we estimate 4,400 marines would be required. As the Marine Corps views it, the cost delta, both in personnel and dollars, is very significant if JVX does not come to pass.

AGE OF NAVY AIRCRAFT

Mr. DOTSON. Admiral Schoultz, in his posture statement, Secretary Weinberger states the Navy fighter and attack aircraft should maintain an average age of 8 to 9 years for the inventory.

What is the current age of the Department of Navy's fighter and attack aircraft?

Admiral SCHOULTZ. What is the current age?

Mr. DOTSON. Yes, sir.

Admiral SCHOULTZ. In 1985 the average age will be 12 years.

Mr. DOTSON. What is the trend in that average age as you are projecting through the 5 years?

Admiral SCHOULTZ. I think it will slightly increase in average age up through the nineties when we start block obsolescences, first blocks of A-6's and first blocks of F-14's, assuming we can continue to buy new equipment.

I would anticipate it is going to increase.

Mr. DOTSON. Last year, Admiral McDonald testified that based on 23-carrier air wings and the current number of Marine air wings about 155 fighter and attack aircraft would be needed to modernize and replace attrition losses.

This figure of 155 is at odds with a figure of 180 per year that was published in the 1979 study by the Congressional Research Service. What is the required level of annual procurement to replace losses and to maintain an averge age of 8 to 9 years, as Secretary Weinberger published in the posture statement for Navy and Marine fighter and attack aircraft?

Admiral SCHOULTZ. I am afraid I had better take that one for the record, sir, if I may.

Mr. DOTSON. Could you also in your reply for the record indicate the differences between the 150 figure, if that is the level required for 8 to 9 average age, and 180 that CRS published several years ago?

Could you reconcile those two numbers?

Admiral SCHOULTZ. I will try.

Mr. DOTSON. Also could you state in that the annual requirement for procurment for forces based on 13-, 14-, and 15-carrier air wings for the 8- to 9-year average?

Admiral SCHOULTZ. Yes, sir. We don't plan to have 15 air wings. We plan to stop at 14. I will get those numbers for you. The 15th will be provided by the Reserves.

[The information follows:]

ANNUAL PROCUREMENT REQUIREMENT

The Navy analysis of the required annual aircraft procurement to support the current force structure of 12 carrier air wings, 3 Marine air wings, 24 patrol squadrons and the support/training/Reserves/LAMPS squadrons indicate approximately 325 aircraft are required per year, of which 150 are fighter/attack. The 1979 CRS study quoted a 1978 OSD analysis which concluded approximately 180 new aircraft are needed annually. The difference between the two numbers relates to the assumption on service life. The 180 aircraft per year rate assumes a 15 year service life, which results in an average age of about 7.5 years for fighter/attack aircraft. The 150 aircraft per year rate uses actual service life, or about 18 years, which results in an average age of about 9 years for fighter/attack aircraft. An additional 7 fighter/attack aircraft would be required per year to support each additional air wing, or 157 for 13 air wings and 164 for 14 air wings.

TANKS

Mr. JAMES SMITH. General Glasgow, can we talk tanks for a minute, please. I think you said your force consists of all M-60A1's. Is that accurate?

General GLASGOW. That is correct.

Mr. JAMES SMITH. Are you considering whether to go to the A-3 or something like that or whether you should buy the M-1?

General GLASGOW. That is part of a study that is ongoing now. That decision was delayed 2 years. I should not say delayed 2 years, but was deferred last May. So within the next year we will make a determination.

Mr. JAMES SMITH. Have you looked at the M-1 in terms of operational handling? Is there any operational reason why you cannot use the M-1?

General GLASGOW. No; not at this time, there is no reason.

Mr. JAMES SMITH. What is the approximate cost to up gun the M-60A1 and still accomplish what you want to do in your upgrade?

General GLASGOW. We are about 6 months away from being able to determine that cost because we are not certain of exactly what we will do. A lot of that will depend on cost. If it is overriding to upgrade it, then naturally the decision will be to go the other way. That is what we are trying to determine.

Mr. JAMES SMITH. Have you gotten the price on the M-1? Have you asked the Army how much the M-1 will cost if you buy it from them?

General GLASGOW. We have the same price that everyone has. You can go from 2½ to 7½ to 12½. Somewhere in between you will find that all of them are correct to a degree, but considerably higher than the M-60 at this time.

Mr. JAMES SMITH. Would you plan to make the decision sometime during this current fiscal year so that you would budget tank procurement funds for whatever option you have in the next budget?

General GLASGOW. That we will. That is the plan.

Mr. JAMES SMITH. Thank you.

F/A-18

Mr. CARL SMITH. Admiral Schoultz, in the Secretary of Defense's posture statement for this year he stated that the Reserves would be equipped with the F/A-18 beginning about 1989.

In Secretary Lehman's posture statement he said he intended to begin equipping the Reserves with the F/A-18 in 1984.

There seems to be a disagreement there. Even the critics of the F/A-18, of those who participated in the OPEVAL who are critical of the F/A-18, said if they had to go into combat, they would prefer to go in the F/A-18 rather than an A-7.

Apparently in their eyes the F/A-18 is a more survivable aircraft. If that is the case, should we equip the Reserves with the F/A-18 before we fully equip the active forces with the F/A-18? Or should we equip the Reserve Forces who will not be among the first to fight with the more survivable aircraft first?

Which would be your preference?

Admiral SCHOULTZ. Let me correct the statement. The correct statement is that they will start, if the plan works, upgrading the Reserves in 1984.

As to which aircraft you would rather be in combat with, I think you would rather be in the F/A-18 if everything that we have seen is true. But the horizontal integration of modern aircraft in the Reserves is a new idea. It does a lot for the morale of the Reserves, which is not a good reason solely to give them F/A-18's but also they are usable, they are recallable, you can use them in combat immediately without having to train them in another type of aircraft.

I recognize the reluctance of those people who would be in A-7's as opposed to the Reserves in F/A-18's, they would like to trade places with them. But we are going to need everybody if there is a requirement for that Reserve and I think the fact is that we are modernizing them, so that we will be able to use them. This is just a start, only one squadron in 1984, the second one comes in 1986.

I don't think that is a significant change and that would not make that much difference. Maybe to the people in the two squadrons who would get the F/A-18 it might make that difference.

We are committed to upgrading our Reserve Forces, and that is a way to start it.

Mr. CARL SMITH. The A-7E's, as I recall from your statement, will begin to reach the Reserves in about 1987, is that correct?

Admiral SCHOULTZ. 1987-88, fiscal year.

Mr. CARL SMITH. Is there any compelling reason why that should not be moved up and the F/A-18 integration be postponed?

Admiral SCHOULTZ. You would only be moving one squadron in that timeframe build the second Reserve squadron. Integration will be later on in 1989. So there will be just a short period in which those two squadrons will have the F/A-18's. The rest of the conversion of their fighters starts in the nineties.

So we are only talking about two squadrons to integrate to the Reserves.

Let me get my schedule here on the F/A-18 introduction.

Mr. CARL SMITH. As you look for that one, Admiral, let me ask the same question on another subject.

If it is important to have pilots who are trained in the F/A-18 as backup for fleet pilots, would it not also be just as effective to have pilots integrated with the A-7E rather than have a squadron fully equipped with F/A-18 aircraft at Alameda?

Admiral SCHOULTZ. No, sir. The current plan is to be at Lemoore. They are moving that squadron from Alameda to Lemoore. They will be on the other side of the hanger with the FRS that is down there now.

The second Reserve squadron is integrated in fiscal year 1986, followed by active squadrons for the *Midway* and *Roosevelt* which will be completed by 1987.

Then we go back to the Marine Corps introduction. So really you are talking about just 2 years for the Reserve squadron formed in 1984 and 4 years for the second one. The horizontal integration upgrade and rapid improvement of the Reserves has been both a secretarial and Navy goal for some time, and we are finally going to do what we have said we were going to do for several years.

I think they will be a vital force. They will be close by. They will get the same training. They could be recalled. If our attrition requirements in any kind of battle are high this is a quick response for more F/A-18 people if the conflict should start before we integrate our other squadrons with the F/A-18.

Mr. CARL SMITH. Were naval Reserve squadrons called to active duty during Vietnam?

Admiral SCHOULTZ. They were not, but there was no declaration of war. I think they were called during Korea. I think that is the last time. You know they do fly; they fly off the carriers and are doing well. In fact, we just deployed a group. We are talking about making a deployment to Europe. They are becoming a more viable force than they have been in the past, and I think that is the proper way to go.

Mr. CARL SMITH. I think the question before the committee is not whether or not it should be done, but when it should be done and whether or not the Reserves should be equipped with the F/A-18 before they are equipped with the A-7E.

Mr. DOTSON. I would like to call on Commodore Weaver if he is here to go through the F/A-18 cost matter again, if we could, to clear up some of the details concerning the exchange this morning where Senator Bingaman talked about cost increase of 102 percent for the total program cost of the F/A-18 from its development estimate.

My review of the more recent selected acquisition report indicates that that is a correct number from the original development estimate to the current estimate. It is about 102 percent increase in current year dollars.

Commodore WEAVER. Yes, sir.

Mr. DOTSON. That, of course, is one way to look at costs. A number of critics have taken those numbers and have used them in articles critical of the F/A-18. I wonder, though, if perhaps another useful way of looking at cost is to comapare unit costs of the aircraft of the same technology era in constant dollars.

AIRCRAFT UNIT COST COMPARISONS

For example, under these criteria how would the program unit costs of the F/A-18, F-14, F-15, and F-16 compare?

Commodore WEAVER. The technology incorporated in the aircraft makes a great deal of difference. In the F-14 with the Phoenix weapon system, it is a more complex weapon system and more costly. Their flyaway unit cost is around $37 million.

The F/A-18 is around $21 million. I believe the current SAR's on the F-16 are in the $12 to $14 million range provided they put in more capability beyond visual range missiles, et cetera, the basic cost will grow as we did note in the 10-year case.

On the technology basis I think the cost growth of the F/A-18 has been relatively constant over the last 3 years, putting in capability and balancing it with tradeoff such as some sacrifice in range that we indicated to you this morning.

Mr. DOTSON. Let me ask you to go ahead and provide for the record, if you will, the comparisons of program unit cost for those four programs in the same year dollars. The information, as I understand it, can be obtained fairly readily from selected acquisition reports.

Commodore **Weaver**. Yes, sir.

Mr. **Dotson**. I believe that what it will show is that while the F/A-18 is more expensive than the F-16 on a program cost basis, it is less expensive than the cost of the F-14 and F-15, is that correct?

Commodore **Weaver**. That is correct regarding the F-14; the F/A-18 costs just slightly more than the F-15 ($28.9 million versus $28.2 million). In constant year dollars the F/A-18 has grown 4 percent over the total program, as the admiral indicated this morning.

We do have the advantage of increased numbers, as do the other aircraft programs. We have seen cost growth in the SAR reporting system, from looking at it about 20 percent in the case of the F-15, 28 percent in the case of the F-14.

Mr. **Dotson**. You will provide specific numbers for the record.

Commodore **Weaver**. Yes, sir.

[The information follows:]

PROGRAM UNIT COSTS IN BASE-YEAR DOLLARS AS OF DEC. 31, 1982 SAR'S

[Dollar amounts in millions]

Aircraft	Baseline estimate	Current estimate	Base year	Increase	
				Dollars	Percent
F/A-18	9.885	10.213	1975	0.328	3.3
F-14	11.350	15.380	1969	4.030	35.5
F-15	7.995	9.239	1970	1.244	15.5
F-16	6.652	7.842	1975	1.190	17.9

Program unit costs in constant fiscal year 1984 dollars

Aircraft:	*Current estimate*
F/A-18	24.66
F-14	[1] 41.31
F-15	[2] 30.12
F-16	[2] 17.35

[1] Excludes F-14B costs.

[2] These unit costs were calculated using escalation indicies for Navy aircraft. Air Force escalation probably varies slightly.

Admiral **Seymour**. As of the September 1982 SAR the order you have them is correct except the F/A-18 and F-16 were the same, 28.6, roughly. F-16 was 21 and F-14 was 42. We will update that based on the December SAR for the record.

Mr. **Dotson**. Thank you.

[The information follows:]

PROGRAM UNIT COSTS AS OF DEC. 31, 1982, SELECTED ACQUISITION REPORTS

[Dollar amounts in millions]

Aircraft	Quantity	Then-year dollars	Fiscal year 1984 dollars
F-14	845	39.55	[1] 41.31
F/A-18	1,377	28.92	24.66

PROGRAM UNIT COSTS AS OF DEC. 31, 1982, SELECTED ACQUISITION REPORTS—Continued

[Dollar amounts in millions]

Aircraft	Quantity	Then-year dollars	Fiscal year 1984 dollars
F-15	1,472	28.19	[2] 30.12
F-16	2,173	20.02	[2] 17.35

[1] Excludes F-14B costs.

[2] These unit costs were calculated using escalation indices for Navy aircraft. Air Force escalation probably varies slightly.

AIRCRAFT READINESS

Mr. **Carl Smith**. General Fitch and Admiral Schoultz, this morning you both spoke about readiness rates of various aircraft. It has been said recently that with the newer, more sophisticated, and more expensive hardware we are procuring that we are in fact getting less for our money because the availability rates of the sophisticated systems are lower than the availability rates of the predecessors, the less expensive ones.

Would you both please comment on that?

General **Fitch**. Mr. Smith, in the case of the Marine Corps we have encountered just the opposite. There is no question over the years we have been introducing more sophisticated aircraft. However, due to concerned leadership, and management programs, we have found that in the last 2 to 3 years we have been able to increase our readiness significantly.

As I mentioned this morning, our aircraft readiness during calendar year 1982 across the board for every type of aircraft in the Marine Corps was the highest it has been in the Marine Corps history. That was specifically 71 percent mission capable, and that is SCIR data based on a 24-hour clock.

So, we are introducing sophisticated aircraft, but we are doing a lot better job of managing those assets.

Admiral **Schoultz**. Ours is going up 2 percent a year across the board. We have gone from 2 to 4 percent across the board in availability and our deployed forces are higher than that in mission capable rating. But for our F/A-18, and I just can't put my finger on an availability number, but the maintenance man-hours per flight hour are down around 10 as opposed to several others that are up in the 50 to 60 range. So, it has to be better.

I just don't have a number for the F/A-18, which is really the only new airplane we have. On the F-14 it has taken some time to get our availability where we want it primarily because we did not fund support in the proper manner. We are coming out of that now. The S-3 was another example. I think the Secretary testified to the fact that it went up 16 percent FMC and 19 percent MC for deployed squadrons in the last year, primarily because we were putting more money in support of that weapon system.

I think across the board, the statement that General Fitch just made is correct. Our more sophisticated aircraft, when we support them properly, obviously do much better; and they are getting better.

Mr. **Carl Smith**. You say they do much better in higher availability.

Admiral SCHOULTZ. Higher availability, higher mission capable rate, yes, sir.

F/A-18 EJECTION SEAT CONTROVERSY

Mr. CARL SMITH. On the subject of the F/A-18 ejection seat controversy, it has been suggested that the current seat in the F/A-18 manufactured by Martin Baker does not meet the original specifications and that it will require substantial modification before it meets those specifications.

Could we ask Commodore Weaver to address that?

Will the currently installed seat require substantial modifications in order to meet the original specifications?

Commodore WEAVER. The current seat as far as the original specifications would have met it. However, in evaluating the situation that evolved you had a nonselectable guide chute, when the pilot ejects he does not have the opportunity to select the glide feature. It automatically starts to glide to assist in evasion from the enemy.

One of the ejections we had, the pilot ejected in a 25-knot wind. This wind coupled with the glide of the chute lined up together and gave him a velocity horizontally of about 47 feet per second. We determined this is unacceptable. We will put in selectable glide in our parachute. This selectable glide feature will eliminate the horizontal glide velocity unless selected by the pilot.

To correct this on the F/A-18 costs $3,400 to put a new headbox, which contains the parachute and the new parachute in the airplane in conjunction with the seat already there.

To make it clear, however, all our other seats will require that same change. In other words, if we put a Stencil seat in or a Douglas seat or Weber seat, we will want to have nonselectable glide chute so that there is a required change for all seats.

Mr. CARL SMITH. Are there any other significant modifications to the current ejection seat that will be required in order for it to meet the original specs?

Commodore WEAVER. We are making minor modifications to the seat. That is presently underway. It is a $1.8 million effort by the Government and the contractor is stating $1.9 million of that. That is to make the modification to the seat itself.

That is within the terms of the specifications, however.

Mr. CARL SMITH. I assume that the Navy intends to go ahead with the competition. It was mandated last year in the appropriation bill, is that correct?

Commodore WEAVER. Yes, sir. We have prepared the proposed cost changes as I indicated this morning. We estimate there will be approximately a $20 million R&D charge associated therewith. About a $6 million installation charge and that is a function of how rapidly we can do it with a $15 to $20 million retrofit change.

Mr. CARL SMITH. When will the RFP be out in the street?

Commodore WEAVER. It is a function of when additional funds are approved. We will probably be able to be in the street in the summer timeframe in June or July.

Mr. CARL SMITH. Can you release the RFP prior to receiving those funds?

Commodore **Weaver**. No. We have to have the funding in order to enter into competition. The only way to do that would be to delay and have the money put in the following year's procurement for fiscal year 1984 or 1985. We do not have the budgetary funding available for 1983.

Mr. **Carl Smith**. You are prohibited from releasing an RFP prior to getting authorization to conduct competition, is that correct?

Admiral **Seymour**. Let me take that one, Mr. Smith.

If I go out with a request for proposal, I do it in good faith. The Navy has taken a position we should not fund our own money. We should ask for money to be given to us.

Since that is our position, I will not allow the RFP to go on the street because I don't intend to pay for it until I am given the money externally.

Mr. **Carl Smith**. If Congress mandated the competition, would you not be in good faith if you relied on the Congress to fund that through a reprograming request?

Admiral **Seymour**. As I said, it is the Navy's position that we are not reprograming our own money to do that. We are asking for additional money. If I had intended to reprogram my own money, I would not hesitate to go on the street while the reprograming request was in process.

We have forwarded to OSD a request for additional moneys to conduct competition.

Mr. **Carl Smith**. Would you compete the magnitude of the reprograming request?

Commodore **Weaver**. We anticipate the R&D charges will run approximately $20 million. It is a function of whether it is done as contractor-furnished equipment or Government-furnished equipment. Then an installation charge of $6 million and retrofit charge of $20 million.

Mr. **Carl Smith**. The reprograming request we can expect to see fairly soon will be on the order of $50 million?

Commodore **Weaver**. We will ask for R&D money first. During fiscal year 1983 we anticipate about $4½ million for that effort as GFE.

Mr. **Carl Smith**. What is the estimated savings on the program if the competition is successful?

Commodore **Weaver**. We don't see any anticipated savings as far as costs are concerned. The costs that we are currently projecting are based on the Stencil costs that were offered in the 1977 timeframe and updated to then year dollars and similarly with the Martin Baker seats.

Admiral **Seymour**. The numbers that we have been using about what the cost would be are presuming that Martin Baker doesn't win the competition. Martin Baker intends to compete.

F/A-18—RANGE DATA PAYLOAD

Mr. **Dotson**. I would like to ask Commodore Weaver a couple of questions concerning the range data payload on the F/A-18 that we went through this morning.

I would like to couch it in terms of aircraft and aircraft comparison that we talked about in looking at cost data. Has there been any analysis done to look at the range payload of the F/A-18 in comparison with other same technology in aircraft such as the F-16A or C or F-15 in the attack configuration, that is, with tanks and external carrier ordnances?

Commodore WEAVER. No, sir, we don't have specific study information on those comparisons because they are Air Force aircraft. Generally, we would anticipate that the F/A-18 is probably in the attack role, attack configuration with three tanks, comparable to the F-16 in that role.

As you move the F-16 up, I think there is little lesser performance, but we cannot verify that.

Mr. DOTSON. Can you provide for the record a calculation showing, let us say the F-15C, F-16A, the F-16C and the F/A-18 carrying the same ordnance, the same ordnance with whatever external tanks that are appropriate and present the radius data for that?

Could you provide that for the record?

Commodore WEAVER. Yes, sir, we will get the data from the Air Force on the same profile as the F/A-18.

[The information follows:]

For the interdiction mission with comparable ordnance loads, we expect the F-16C to have slightly better combat radius than the F/A-18, the F-16A to have a radius somewhat less than the F/A-18. The F-15C radius should be significantly better than the F/A-18 radius. To our knowledge a direct analytical comparison among these aircraft, using validated performance data and identical ground rules, has not been performed by any agency of the government.

Mr. DOTSON. Admiral Schoultz, there were some flight tests conducted with the F/A-18 to attempt to verify the 550 nautical-mile radius in the attack mode.

As I understand it, these profiles were flown or were attempted to be flown according to a rather rigorous profile or flight, the kind of flight you would expect test pilots to fly to make exact parameters on this mission profile. Is that correct?

Admiral SCHOULTZ. Yes, sir.

Mr. DOTSON. It is then the Navy's position that based on these flight test data that the F/A-18 in the attack configuration has met the 550 nautical-mile radius requirement?

Admiral SCHOULTZ. As you indicated, the profile parameters are very precise. They were not flown very precisely. They were flown very imprecisely, as a matter of fact. In the engineering analysis of all the numbers—the computations—indicated that the airplane would fly the 525-mile flight in that same profile, with FLIR/LST.

Some parts of it were flown accurately, some parts were flown inaccurately. When they reran the performance numbers and corrected for deviations, it did meet the threshold. However, by making turns at less than the optimum required forces and turn rate he used up a great deal more fuel than planned; but the pilot was not a test pilot.

The data that was returned from the flights indicated the aircraft would fly the 525-mile profile as required.

Mr. DOTSON. So it is Navy's position that the aircraft has met its requirement as outlined in DCP for the attack configuration?

Admiral SCHOULTZ. That is a complicated question—in which DCP and which specification? I can say without any question that we in the Navy are pleased with the capability that the aircraft possesses and the range is not a problem.

Mr. CARL SMITH. Last year the Appropriations Committee included language in their bill that restricted the expenditure of any funds for the attack configuration of the F-18 or expenditure of funds on the F/A-18 replacing aircraft in the attack squadrons until the Secretary of Defense certified that the F/A-18 had met the original specifications for the attack aircraft.

Has the Secretary of Defense made such a certification?

Admiral SCHOULTZ. No, he has not at this time.

Mr. CARL SMITH. Are there any funds in the fiscal year 1984 request then for aircraft that will replace light attack aircraft?

Admiral SCHOULTZ. Yes, sir. In 1984 they are for Coral Sea aircraft, the two fighter squadrons. The reserve squadron is, whether you would say it is an attack aircraft or strike fighter, which is a new animal, but the aircraft that are purchased in 1984 ultimately could be programed into attack aircraft or former attack aircraft.

Mr. CARL SMITH. Does the Navy intend to proceed with procurement of these aircraft despite language that prohibits expenditure of those funds until there is certification from the Secretary of Defense?

Admiral SCHOULTZ. Yes.

Admiral SEYMOUR. The Navy has not yet spent money on the aircraft. We do not intend to proceed until the Secretary of Defense has certified or the Navy changes its plans for the aircraft. They could go to the marines, for example.

Mr. CARL SMITH. So failure of the Secretary of Defense to make that certification anytime in the near future would not necessarily justify reducing the number of F/A-18's to be procured in fiscal year 1984. Is that right?

Admiral SCHOULTZ. No. Because you have fighter aircraft squadrons you need for *Coral Sea* and *Midway* and the additional squadrons could be diverted to the marines.

ENGINE AND SPARE PARTS PRICING

Mr. CARL SMITH. Admiral Seymour, there has been much criticism directed at one of the engine manufacturers for its pricing policies. Two of the allegations concern the rising costs for engines and the rising cost for spare parts.

Has the Navy experienced a difference between the cost policies of the two major engine manufacturers with whom you deal, General Electric and Pratt & Whitney, and if so, would you describe them, please, in terms of both the engine prices and spare parts prices that you pay?

Admiral SCHOULTZ. I am not sure it would be fair to characterize it as there being a great difference between the two.

Pratt & Whitney came to my attention in October and I initiated a dialog with the chairman of the UTC concerning prices in the last few years and what we were looking at this current year. That dialog has led to a number of meetings and some visits. They are currently with a proposal to us for a 1983 purchase—I believe it is 1983—that is within 2 percent of the 1982 price which means that we have turned that around, that increasing rate.

A lot of it was due, and we have a joint team looking at the background as to why those costs were incurred including DCAA and the Air Force, but a great deal of it is due to material cost and double digit inflation during the period 1979–81.

GE has not been that big a problem partly because they have a rapidly expanding business base, in my view, on the F404 which is ramping up in production rate coincident with the F/A-18 as is the T-700 which is ramping up in production rate coincident with the Black Hawk and the H-60, the LAMPS.

The Pratt & Whitney base for me, though, is very steady, constant and not ramping up at all. The J-52 for the A-6's is on a business base and F-14's which are also perfectly level. My contracts group is currently working with the Air Force and Air Force systems command and should have by this late spring a study completed or a review completed of the Pratt & Whitney pricing over the last 3 years.

Mr. Carl Smith. Are you also reviewing the pricing practices of General Electric over the same time period?

Admiral Seymour. Yes, sir, we are, but it is not that form of such an intensive study. General Electric I started reviewing maybe 2 years ago, but at least a year ago in connection with the T-700 pricing to the Government as opposed to the T-700 pricing for commercial sales overseas.

I found that the difference there was that General Electric was intentionally trying to get into the small engine business market and was willing to take a loss for allegedly a high number of years in order to sell those overseas units.

Of course, I, representing the Government, cannot take pricing of that nature from somebody who is going to be sole source in the future. I must pay my costs up front. That is why we were paying a higher price for the T-700.

We have a very good working relationship with General Electric, Lynn, and the NAVPRO who is located at Lynn is being given full access to the shop costs for all engines whether they are commercial or Navy, and being able to get full visibility over everything except the final commercial price that they charge for the commercial engines. But in all the shop work he has full visibility so that he can assure us with his auditors and his use of the DCAA auditors in Boston that the price we are paying is quite fair.

We have not caught General Electric, in my view, trying to bill us for what we would view as an unreasonable amount for spares or engines, but the big difference is that General Electric has an increasing business base and Pratt & Whitney's is basically level for U.S. Navy products.

Mr. Carl Smith. Has Pratt & Whitney tried to bill you for any unreasonable expenses?

Admiral Seymour. I have communicated my concerns that perhaps they have to the chairman, and to the company, and that is related to the current ongoing review. I use review instead of investigation because they don't have subpena powers or anything like that, but there is a good size group of Air Force, Navy, DCAA auditors looking at what they have been charging over the last 3 years and trying to essentially certify to us that they did not overcharge us or certify that they did.

If they did, then we intend to proceed for recovery of consideration.

F/A-18'S TO SUPPLANT A-6'S

Mr. **Dotson**. General Fitch, last year the committee looked at an option for moving A-6's out of the Marine Corps into the Navy in return for bringing on F/A-18's to supplant A-6's in the close air support role.

During the intervening year has there been any analysis of the specific tradeoff of the A-6 for F/A-18 for the Marine Corps?

General **Fitch**. Mr. Dotson, we have looked very carefully at our all-weather attack mission. As I alluded to this morning in my presentation, the Commandant expressed his position during the process of the hearing a year ago and said he was unequivocably opposed to losing the A-6 all-weather attack capability.

He reaffirmed that statement about a week ago in the Senate Appropriations Committee hearing. What we have is the subject of all-weather close air support.

The F/A-18 is a tremendous attack aircraft. It will do the attack mission in the daytime. It will do the attack mission at night. The fact is that the F/A-18 is not an all-weather attack aircraft.

Mr. **Dotson**. What would be required to give it that capability?

General **Fitch**. I would like to ask Lieutenant Colonel Finneran from my staff to elaborate on that point. He is a bomber navigator in the A-6 and program manager for the F/A-18. He can give his estimate of the cost associated with giving true all weather capability to the F/A-18.

I understand that number is between $400 and $700 million in R&D. I will ask Lieutenant Colonel Finneran to elaborate.

Colonel **Finneran**. Mr. Dotson, there are two areas that I would like to address.

First of all is crew configuration. The F/A-18 configured as a single-place airplane. With our experience in the A-6 we feel you must have a two-place airplane to carry out the low level all-weather attack mission. If you look at the Air Force, they made the same decision with the F-111.

In terms of the weapon system the F/A-18 is a super under the weather, night, and marginal weather airplane, but not a true all-weather airplane.

The A-6 allows the crew to simultaneously navigate to their target, terrain clear while they are navigating, pick up the target, radar track and conduct an attack. With the F/A-18 the pilot has to choose an option. He can either navigate and target track, or terrain clear.

Mr. **Dotson**. There are two-place versions of the F/A-18, are there not?

Colonel **Finneran**. Those are trainer aircraft. They are not configured with the second seat for weapon system operator.

Mr. **Dotson**. So to prepare aircraft for this role, there would have to be some internal configuration changes to provide for weatherization of the aircraft?

Colonel **Finneran**. That is correct.

Mr. **Dotson**. Will you address that issue.

Colonel **Finneran**. Yes, I will. In the A-6 you have capability now for RABFAC coordination. On the ground, AN/PPN-19 radar forward air control [RABFAC] can work with the airplane by providing beacon for offset bombing monitoring capability. That capability can exist in the F/A-18. RABFAC capability is currently in the F/A-18 DCP but it is not in the aircraft now. Another weapons system would have to be added to the airplane to make it as capable as the A-6 today.

General **Fitch**. I understand that if that were funded, it would be 1988 or 1989 before it would be introduced in production aircraft. Commodore Weaver can address that also.

Colonel **Finneran**. The other capability, the A-6, of course, has is radar target tracking. The F/A-18 uses the inertial navigation system to hold the cursor course on the target. It is not an automatic radar target track.

You have a problem keeping good radar target tracking with the F/A-18. To go into a targeting mode it has to use doppler beam sharpening. It allows the sector patch radar presentation to be displayed in the cockpit at distances as far as 40 miles. The only problem is when you adopt the doppler beam sharpening method you have a 10° notch on the front of the aircraft where there is no radar presentation. That precludes any kind of terrain clearance or navigation while you are looking at the target 40 miles away. The way the F/A-18 would have to attack the target would be to ingress on its inertial navigation system [INS] while looking at the target patch 40 miles away at 10 or 12 miles turn into the target and fly to the target on the FLIR. Then make a FLIR attack on the target.

If they go to real beam radar, the resolution is not good enough to do the kind of radar attack you have to do in an all-weather environment.

So, what you have is an under-the-weather night airplane with FLIR as opposed to an all-weather airplane. The A-6 can target track while scanning on its radar for train clearance and navigation. It is built for all-weather attack.

Mr. **Dotson**. As I understand this, what you are saying is basically it would require a two-place airplane. Are there such F/A-18's?

Colonel **Finneran**. Yes, sir.

Mr. **Dotson**. To acquire the capability that the Marine Corps would desire relative to A-6 there would have to be avionics and system improvements in the airplane to give you that capability?

Colonel **Finneran**. Yes, sir. We have no particular objection to the airframe. It is the weapon system capability, the difference between the A-6 and F/A-18 that we are concerned about.

Mr. **Dotson**. What is the magnitude of resources that a development program would require to put this kind of capability in the airplane and when could you have it?

General **Fitch**. I will ask Commodore Weaver to address that question.

Commodore **Weaver**. I concur in the point the colonel has made, about putting in terrain clearance. We have a terrain avoidance feature in the F/A-18. With terrain clearance we have to go to a stimultaneous multiradar mode or put a second radar as in the F-111.

To give you that capability plus putting the full display in the rear seat we estimate $270 to $700 million. The amount of time depends on how fast the very high-speed integrated circuit radar comes along. This is a little bit in the future at this point in time.

To give you the rapid transfer features to fill in the notch will probably be something in the neighborhood of 1986 or 1987. We would see a 3- to 4-year development period to get that full capability presented to the airplane.

Mr. DOTSON. Up to $600 million?

Commodore WEAVER. Anywhere from 275 if the other technology comes along and if you wait for it or if you want to press that technology, somewhere in the vicinity of $700 million. Fundamentally radar has difficulty however looking through heavy rain or clouds.

Mr. DOTSON. General Fitch, what would be the trade-offs in having the A-6 perform this mission or an upgraded F/A-18 perform the mission from a Marine Corps aviation point of view?

General FITCH. First, we feel very strongly that the current A-6 will have a limited capability to survive in the threat of the mid to late 1990's, so we do feel that the all-weather attack capability as far as the Marine Corps is concerned does have to be upgraded just to meet the threat that we project.

As to whether that is a follow-on to the A-6 or whether that was an adaptation of the F-18 to give it a true all-weather capability, at this point in time we have really no preference.

My inclination as a former all-weather attack pilot is that a side-by-side seating arrangement such as is currently in the A-6 is a much better way to do the all-weather attack mission than a tandem seating such as you would have in the F/A-18.

Mr. DOTSON. Is this issue under active review in the Marine Corps?

General FITCH. That is right. We have looked at it very, very carefully. We do feel we have to have an upgrade in our capability in the 1990's. If it happens to be the F/A-18, then that will be fine. If it happens to be an upgraded version of the A-6, that will be fine. It does have to be an improvement.

MRASM

Mr. CARL SMITH. Turning to a less controversial subject, I have some questions concerning MRASM. Recent press articles suggest the Air Force was considering dropping support for the medium range air-to-surface missile.

What is your personal opinion about continued Navy participation in the program.

Admiral SCHOULTZ. Mr. Smith, you asked me for a personal opinion?

Mr. CARL SMITH. I did.

Admiral SCHOULTZ. My personal opinion is that I don't think we have a requirement for MRASM. I am not absolutely positive of the official Navy position, but I think we can do the mission with other weapons.

It is awful expensive. It has to be built specifically for the Navy because of the size of our ships weapons elevators. I have a real expert on MRASM here. Vice Admiral Monroe, Director of the

Navel Research, Development, Test, and Evaluation Office. That is where MRASM is. I would like to offer him a chance to speak on this subject.

Admiral MONROE. I would not describe myself as a real expert, but possibly a couple of more years, in OPNAV than Admiral Schoultz gives me a little bit greater institutional memory in the twists and turns of this program.

With regard to the official Navy position, I can give you that. We were directed in last year's appropriation bill to continue in the joint program with the Air Force and support their development and that is exactly what we are doing. Congress appropriated about $20 million in the Navy fiscal 1983 budget R&D. We have about $20 million in Navy fiscal 1984 budget, which was the amount established by the Secretary of Defense last fall in the final budget preparation; and we are preparing to support the program in the future as directed.

In the past 2 successive years in testimony on the fiscal year 1982 appropriation and the 1983 appropriation, we have stated the Navy position exactly as Admiral Schoultz stated his personal position.

Mr. CARL SMITH. That is that you don't see a requirement for the missile, is that right?

Admiral MONROE. Yes. Given our choice, or when asked our advice, we say we do not believe it is a high priority program for the Navy to pursue and have recommended both to the Secretary of Defense and the Congress that we not pursue it.

Mr. CARL SMITH. What are the reasons for your feeling that the Navy does not have a requirement for this missile, given that the car is a 1,000-pound warhead? Is there a head shake?

Admiral MONROE. It is a [deleted].

Mr. CARL SMITH. [Deleted.]

Admiral MONROE. As in any assessment of requirements, you have to look at alternative ways of doing the job, and I will give a few words on this. Then I believe Admiral Schoultz, who is the aviation requirements spokesman for the Chief of Naval Operations, might want to add to it.

For ship attack, we have the basic Harpoon missile, which is an outstandingly effective weapon with high reliability, high kill probability, adapted to submarine, surface, and air launch from multiple aircraft in wide use throughout the fleet, and will be supported logistically. It will handle almost all current and most of the projected antiship requirements.

We have several very low cost, but highly effective improvement efforts going on in Harpoon to make it better. There are also other standoff weapons, such as the Laser Maverick which General Fitch testified to this morning which has shown itself in operational testing to be remarkably effective. Another is IIR Maverick, which is a Navy standoff weapon of somewhat different capability than the Air Force missile which has received such notoriety.

I should make one final comment. This subcommittee does not review the basic Tomahawk program; but as you know, we are pursuing that missile very actively as one of the highest priority Navy programs. We have inventory objectives of several thousand Tomahawk missiles for 3 missions: antiship, conventional land attack, and nuclear land attack. The missile is adapted to many ships and submarines, with ranges from about 250 miles up to about 1,300 miles standoff. As these missiles enter the fleet they represent an entirely new capability of distributed offensive power unlike what we have had before. Therefore some of the air-to-surface standoff demands that have been placed on naval aviation in the past will be alleviated by the standoff capability of this great variety of Tomahawk weapons.

Mr. CARL SMITH. Tomahawks are all surface or subsurface launched?

Admiral MONROE. That is correct, but they are launched from ships in the same battle group that would launch the aircraft that would air launch the MRASM.

Finally, there are other efforts of higher classification.

I might ask Admiral Schoultz to add any additional requirements or comments on standoff.

Mr. CARL SMITH. Before you do that, Admiral Schoultz, may I ask Admiral Monroe a few more questions?

You mentioned, Admiral, the Harpoon was also available to do the same job.

Admiral MONROE. In the antiship role.

HARPOON VERSUS MRASM RANGE

Mr. CARL SMITH. Would you compare the range of the Harpoon with the range of MRASM and tell us whether or not you need the additional range that you get with MRASM? I am particularly interested in whether or not you can stand off outside the defenses of the Soviet combatant and attack it without exposing yourself to those defenses.

Admiral MONROE. A good question. First, Harpoon. Its current air launch range is [deleted]. This is being increased slightly by changing [deleted]. It will be launched from aircraft flying below the envelope of the enemy surface-to-air missiles.

For example, at a standoff range of 40 miles you have maybe 600 feet or so of altitude below the radar horizon. [Deleted.]

Another way would be to stay below his radar horizon completely and rely on standoff targeting from an E-2C that was well outside his surface-to-air missile range.

So, against most of the surface forces today, we believe Harpoon could be launched without causing any significant attrition of the attack aircraft.

Now to move to MRASM. It has a much longer standoff range. If you consider [deleted] the maximum range for Harpoon, MRASM gets [deleted] under some circumstances. Targeting at that range is a real problem. You simply cannot locate and identify a ship at long range.

Additionally, you are firing from a mobile platform against a mobile target that is going to move a considerable distance during the time of flight, the relatively long slow time of flight of the subsonic MRASM at long range.

Of course, MRASM [deleted].

So, in terms of usable range the two missiles are about the same. While MRASM has a greater standoff, we don't really see any great need to have [deleted] standoff against ship targets.

I think tactics would essentially make the two weapons, Harpoon and MRASM, have equal utility against enemy battle forces.

I would like Admiral Schoultz, though, who is the requirements spokesman, to comment on this and correct me if I have stated it incorrectly.

HARPOON/MRASM COST COMPARISONS

Mr. **Carl Smith**. Would you compare the cost of the Harpoon with the cost of the MRASM?

Admiral **Monroe**. MRASM is harder to cost because it has never been flown. In many aspects it is a paper missile. To comment on what seems to be a popular misconception, MRASM is not common in many particulars with the basic Tomahawk. The engine is different, the warhead is different, the airframe is different, guidance is different. No MRASM has yet been flown. We estimate that the IOC for the Navy's MRASM, if our development were carried through to completion, would be about fiscal 1988 or 1989. Thus pricing a small buy of MRASM in then year dollars against Harpoon that we are buying today in long quantities is a bit difficult.

I would guess three to one maybe, cost difference between MRASM and Harpoon.

Mr. **Carl Smith**. You would guess that the MRASM will cost three times as much as the Harpoon will?

Admiral **Monroe**. Yes, sir.

Mr. **Carl Smith**. How about the weight of the two missiles? How do they compare?

Admiral **Monroe**. MRASM is 2,250 pounds. I would guess somewhere between 1,100 and 1,400 for Harpoon, considerably less weight.

Mr. **Carl Smith**. So the MRASM weighs 2,250 pounds and the Harpoon weighs between 1,100 and 1,400?

Admiral **Monroe**. That is my estimate.

Mr. **Carl Smith**. Can you provide for the record?

Admiral **Monroe**. Yes; I can.

[The information follows:]

Weights of MRASM and Harpoon Missiles

The weight of the MRASM is projected to be 2,200 pounds. The weight of the Harpoon missile is dependant upon launch configuration as follows:

	Pounds
Air launch	1,150
Surface/sub launch	1,502
Air-launched Harpoon weighs	1,150

A-6 WING LIMITATION

Mr. **Carl Smith**. What is the wing limitation on the A-6?

Admiral **Monroe**. 2,250 pounds is a good working number for that.

Admiral **Seymour**. Generally our plane stations are limited to 2,250, but all the airplanes should have one high weight station. The A-6 is 2,500.

Mr. **Carl Smith**. Is that to come back aboard? Is that to take an arrested landing or simply for carriage?

Admiral **Seymour**. Simply for carriage.

Mr. **Carl Smith**. What is the weight limitation coming back aboard.

Admiral **Monroe**. We have been using 2,250 widely throughout the Navy for the last several years for all types of air-to-ground standoff weapons for catapult takeoffs and arrested landings, are effective carrier-based operations. It may be slightly different, but 2,250 is a good working number.

Mr. **Carl Smith**. Would the carriage of the MRASM on one wing require carriage of another offsetting weapon or store of some sort to balance the aircraft so you did not have an asymmetrical problem? Can you come aboard with one full tank?

Admiral **Seymour**. No, sir, you would have to have a balance.

Mr. **Carl Smith**. Could you carry the MRASM on centerline or is that restricted for fuel?

Admiral **Seymour**. I don't know.

Mr. **Carl Smith**. For the record the question I am getting at is this: If you have a 2,250-pound missile and store to offset your asymmetrical problem on the other wing, that does not leave much fuel to work with when you come back aboard ship.

Can you give us an idea, and again this should be for the record, could you compare the fuel available for an A-6E returning at maximum Trap weight with Harpoon, compare that with the maximum trap weight and fuel available for an A-6 returning with a MRASM and whatever offsetting store it has to have on the other side?

Admiral **Monroe**. We will provide that for the record.

[The information follows:]

An A-6E could land with one single asymmetric MRASM on an inboard wing station. A counter-balancing store is not required. If the A-6E were to return at max trap weight with one asymmetric MRASM, It would have approximately 4,450 lbs of fuel. Note that it would also be carrying the MRASM data-link pod on the centerline station. An A-GE returning with a single Harpoon would have about 6,350 lbs of fuel.

Admiral **Schoultz**. One other thing on MRASM. Senator Levin talked about this earlier. You don't have all the assets that you want. The price on MRASM looks like it is going to be terribly expensive. You just can't have everything and that is really a golden bullet versus a silver bullet. We think we can do the job with other assets. It's just a big pole to get under the tent.

Mr. **Carl Smith**. Would you address the number of MRASMs you can store on board a carrier compared with the number of Harpoons that you can store aboard?

Admiral **Monroe**. We would plan to put 20 MRASMs aboard a carrier and to offload iron bombs and other less sophisticated ordnance. I don't know what the trade off with Harpoon is. I will have to provide that for the record.

[The information follows:]

The number of Harpoon missiles that will be loaded-out on a carrier is [deleted].

On CV-67 and older carriers, the [deleted].

On CV-68 and new carriers, the [deleted].

There are numerous other direct or combination trade-off comparisons, but the MK 82 is given because it is a standard weapon and there are a relatively large number included in each load-out.

Admiral MONROE. With regard to that last comment by Admiral Schoultz, if I may, when I gave you the IOC, I said there would be an IOC in 1988 or 1989. I neglected to also describe the additional R&D cost beyond what is now programed, what we now have in the Navy program that would be required if we were to pursue MRASM to completion as a Navy attack weapon rather than doing it, as has been directed by the committees, to continue to support the joint development. That number is somewhere upwards of $200 million in R&D beyond that which has been spent in the past and is currently planned and budgeted.

Mr. CARL SMITH. If you were to adapt Harpoon to equip it with an IR seeker, what would you estimate that R&D would require?

Admiral MONROE. I will have to provide that for the record. As you know, we had a program for IIR Harpoon 2 years ago, and it was our No. 1 priority air-to-surface weapon. We were directed to terminate it by the Congress. We did; and I don't have the data at this time.

[The information follows:]

IRR HARPOON

A rough-order of magnitude (ROM) figure for a 3-year RDT&E program for IIR Harpoon is $130 million.

A preliminary estimate of funding associated with the addition of a Harpoon IIR seeker development program indicates a requirement of $128.2 million over a 3-year period as follows:

Fiscal year:	*Millions*
1984	$42.2
1985	54.0
1986	32.0
Total	128.2

Mr. CARL SMITH. The HARM missile, the Navy has indicated they would like to continue to pursue a second source for the HARM missile. There is some question now as to whether or not the Navy is sincere in its desire to establish a second source.

Admiral Schoultz, would you tell us in your opinion whether there is a sincere attempt to provide some competition in the program or whether it is an empty threat to Texas Instruments?

Admiral SCHOULTZ. We are sincere in attempting to find a second source. We are making every effort possible to get the price down.

As you know, Texas Instruments reduce their price 20 percent initially and came in with some more price reductions after some real hard jaw-boning, but the cost is still high. The second source, of course, costs additional money up front, but we are committed to go for a second source.

There has been a lot of effort to reduce the price of this weapon and even looking to reduction in capability which is, of course, an absolute last resort. I have the program manager here for HARM who I would like to have address that if it is all right.

Mr. CARL SMITH. Please.

STATEMENT OF COMMODORE ROBERT H. SHUMAKER, U.S. NAVY, PROGRAM MANAGER, DEFENSE SUPPRESSION SYSTEMS

Commodore **Shumaker**. I have five VuGraphs. This is a summary. I think you noted that HARM is a replacement for Shrike and standard arm. We are still planning a joint service inventory of [deleted] missiles. Its frequency coverage addresses about [deleted] percent of the Soviet threat and you can see that the range is substantial.

HARM: Summary Fact Sheet

Replaces Shrike and Standard Arm; inventory objective is [deleted] Air Force), UK and FRG FMS interest; [deleted]; A-7E and F-4G; integration underway on F/A-18 and A-6; maximum annual rate will be 3,000, presently funded capacity is 300 per year at TI; development cost was $350M; procurement cost will be about $6.6B; Navy IOC: [Deleted] Air Force IOC: [Deleted.]

We have production missiles now being delivered and we expect to——

Mr. **Carl Smith**. May I interrupt you for just a second?

Our purpose is to establish a record so if anybody wants to excuse himself temporarily, feel free to do so.

Commodore **Shumaker**. I was mentioning we expect to field HARM on the [deleted] on deployment.

Operational Testing

Scope: November 1981 to November 1982; two phases, baseline software; EOM software; 35 firings attempted, 27 evaluated; 1972 hours of captive flight, 73 hours in Europe; A-7E's and F-4G's.

Results: [Deleted.]

We have just completed some extensive operational testing in the past year in which we accumulated about 2,000 hours of flight time and fired 35 missiles. About 70 of those hours were conducted in [deleted].

The missile was intensively tested and we are quite pleased with the results.

I would like to indicate that during the testing there was one shot fired that fully exercised the missile's capability. We illuminated an A-7E by a radar that was [deleted] degrees relevant to the aircraft at a range of [deleted].

The aircraft radar warning receiver detected that condition and informed HARM. The pilot merely had to squeeze the trigger and take evasive action and the missile was able to come within [deleted] of the target at [deleted].

Contractual Status (Production)

Fiscal year 1981: 80 missiles; 75 percent completed; CPFF: target price $102M (ceiling $121); shareline 0/100 from $111-$121M; LRE is $109M; Deliveries: 16 of 80 missiles (on schedule).

Fiscal year 1982: 236 missiles plus Navy Avionics; 13 percent completed; FPI: target price $181M (ceiling $195M); shareline 50/50 under, 65/35 over; LRE is $179M.

Fiscal year 1983: Long lead contract 31 January Avoids gap, limits Government liability; 222 tactical missiles; definitization scheduled July 1983; FFP.

We have three contracts underway. Texas Instruments is the prime contractor. The entire period of procurement is 10 years from fiscal year 1981 to fiscal year 1991. We have progressed from a cost-plus fixed-fee contract in fiscal year 1981 through a fixed-price incentive contract, now we are procuring under a firm fixed-price contract. As I indicated, the first procurement contract is now delivering missiles. That contract is overrunning about 7 percent.

The second contract in fiscal year 1982 is underrunning by about 1 percent. In fiscal year 1983 we have not fully turned on the contractor in anticipation of going to DSARC, we hope, within a week's time. They are, however, funded on a long-lead basic so as to avoid a production gap.

Government Actions to Control Cost

Developed documentation package suitable for competition; capped fiscal year 1981 and fiscal year 1982 contracts, fiscal year 1983 FFP; funding component/subsystem second sourcing; initiated second source selected for all-up-round; emphasizing cost reduction producibility changes; emphasizing cost reduction in P^{3}I; invested $2.5M Mantech funds; extracted three year not-to-exceed proposal from present prime, reduced fiscal year 1985 prices by 24.5 percent over last 9 months.

Some of the actions the Navy has taken to control costs, as you see, are focused on competition, both at the vendor level and at the prime contractor level. With the present prime contractor although the first year's production was under a cost-plus basis, we capped it with a ceiling so as to get certain fixed price features on the contract. We have responded to congressional direction in developing selecting a second prime source. We have made that selection and expect to make an announcement as to who that prime source will be. We are emphasizing cost reduction through producibility change. We recently committed to a number of engineering changes which we feel will reduce the price of the missile by about 5 percent.

We are also emphasizing new technology and bringing that on in our planning process through a pre-planned product improvement.

We have also invested in manufacturing technology features that have succeeded in reducing the labor in certain specific assembly areas by as much as a factor of four.

My last item on that chart indicates that we asked the present prime contractor to give us a 3-year proposal. That is not to be confused with a multiyear procurement. These are annualized contracts, but are based on options for the second and third years. That was proposed originally last summer. We recently asked them to repropose on the same basis.

You have seen on the chart that the price reduction was quite substantial, close to 24 percent. We are pleased with the downward direction of that unit price.

Recommendation

Support Navy fiscal year 1984 WPN funding request for HARM; $194.6M; 230 missiles.

The final chart shows you the Navy's portion of this joint service request for fiscal 1983 is $194.6 million. We expect to procure 230 missiles with the sum.

Mr. Carl Smith. Commodore, with two sources producing the missiles, at what point do you expect to break even on your investment to tool up the second source?

Commodore SHUMAKER. That is still under analysis. Last summer we analyzed that in quite extensive detail and concluded that the break-even point was pretty close to our inventory objective.

Since that analysis last summer we feel that the present prime, Texas Instrument, has increased their price and we are now somewhat smarter in knowing what the second prime contractor would be bidding. Both of them have come down in price. The exact point as to where the crossover lies is to be completely analyzed. We anticipate that it will be less than the inventory objective.

Mr. CARL SMITH. There has been considerable talk about a low-cost option using a new Seeker that was developed out at China Lake. Would you comment on that? Does that represent the new missile or does that represent a possibility for modification to the current HARM missile?

Commodore SHUMAKER. I would say the latter. It represents a possibility for modification to the present missile. It is the result of technology that has been funded through other development programs and through some Army efforts. It encompasses a better way of building stripline technology and microwave circuit boards. Our present analysis is that it has high promise for cost reduction amounting to about 40 percent reduction in the receiver section of the missile which would equate to about a 20-percent reduction in cost.

Mr. CARL SMITH. Does the possibility of being able to incorporate that new Seeker argue in favor or against a second source? Does it affect that matter in any way?

Commodore SHUMAKER. We think it argues in favor of a second source because before the second source could really even build the newer technology he would most likely have to go through a period of learning how to build a microwave circuit board.

Mr. CARL SMITH. You said you will announce next week the result of the second source competition?

Commodore SHUMAKER. That is our expectation. We are expecting to have a DSARC review next week.

Mr. CARL SMITH. When will you expect to award the contract to that second source?

Commodore SHUMAKER. If that is the decision of the DSARC, we would expect to have a contract in place by April.

Mr. CARL SMITH. Is there still a reasonable possibility that the Navy will decide not to proceed with a second source, but will instead prefer to go with a fixed-price contract with several options with the prime contractors, Texas Instruments?

Commodore SHUMAKER. We are open to both. Admiral Schoultz indicated it is not an empty threat. We are complying with congressional direction to go ahead with a second source.

Mr. CARL SMITH. The question is: Is it still a reasonable possibility that you might not choose to go to second source?

Admiral SEYMOUR. That is too hard for us to answer. In my judgment the answer is no, but I could be overruled.

Admiral SCHOULTZ. It is our plan now to go forward with that position.

Mr. CARL SMITH. You fully intend to develop a second source?

Admiral SCHOULTZ. Yes, sir.

Mr. DOTSON. Let me ask this last series of questions.

VERTICAL TAKEOFF

General Fitch, in terms of mission radius pertaining to the AV-8B, was that mission radium less than that of the currently fielded AV-8C—in any of the modes of operation, either STOL, short take-off plane or B—looked at during the OT-2B?

General FITCH. In the vertical takeoff [VTO] mode the operational evaluation indicated that the AV-8B radius as tested was less than the AV-8C. Now the reason for that is that the lighter weight AV-8C has the same lift improvement devices that the AV-8B has.

Those lift devices were provided by the AV-8B program. The difference in empty weight of the two aircraft is about 700 pounds, but I would like to check that for accuracy.

What you have in the vertical takeoff mode is the AV-8C that is 700 pounds lighter than the AV-8B with essentially the same thrust at present and the same lift improvement devices. So, the AV-8C at this point in time would be superior.

We do expect the AV-8B to meet the specifications for vertical takeoff and to fly a mission radius of 50 miles.

Mr. DOTSON. General Fitch, what was the mission reliability of the AV-8B and OT-2B against the probability of completing a 100-hour sortie.

STATEMENT OF COL. JAMES W. ORR, U.S. MARINE CORPS, AV-8B PROJECT MANAGER

Colonel ORR. According to the statement I have in my briefcase, we were slightly short of the mission reliability. However, upon quizzing the operational testers, they agreed that that was not a criteria for the IOT&E and it should not have been in the report. I don't think they are going to go back and correct it. At least at my level that problem has gone away pretty much. It will still be a criteria for OPEVAL.

Mr. DOTSON. In light of these results from OT-2B, is it the Marine Corps' position that the AV-8B program should be strongly supported?

General FITCH. It is our position that the AV-8B program should be strongly supported. We expect all deficiencies that were identified in the quick look, OT-2, to be promptly solved or corrected.

The only significant program that we have been able to discern is that specific excess power available, that P sub S (Ps) that was referred to, and we are confident that with the production F402-RR-406, engine a good portion of that will be solved.

Also, we are confident that McDonnell will be successful in the drag reduction program. We have every expectation that the AV-8B aircraft will meet all specification needs.

I would even quote some of the statements made in the OPEVAL or I could provide those for the record.

Mr. DOTSON. Why don't you provide those for the record.

Thank you.

[The information follows:]

AV–8B IOT&E

PROBLEMS AND CORRECTIVE ACTION

Performance, acceleration and low level speed: Reduce drag; increase operational thrust rating in interim engine; install production standard engine—F402-RR-406; flights with enhanced thrust levels have been successful.

Immature software in weapons system: All modes developed and installed—currently completing weapons accuracy demonstrations; displays revised and updated.

Inadequate cues during high-g maneuvers: Oral stall warning incorporated.

Range and radius: Demonstrated long range/loiter capability; STOVL operations enhanced by revised thrust ratings.

Reliability: Insufficient data at IOT and E; current accumulated data better than predicted at this stage—"on spec."

No anti-radiation missile capability: Sidearm compatible; No HARM decision.

GAU-12 gun, performance penalty; loading procedures: Installed on aircraft number 4; flight test, 8–10 knots penalty; defined as "role equipment"—will configure for mission; manual loading trials pending, nature and scope TBD.

SYSTEM HIGHLIGHTS

Self-contain navigation system (INS); weapon system logic (computer and SMS); target acquisition aids; cockpit displays; weapons system accuracy.

". . . a significant improvement over existing Marine Corps light attack . . ."

". . . observed weapons delivery accuracy in the CCIP mode was excellent . . ."

HANDLING/SAFETY

". . . flying qualities and inherent stability . . . were vastly superior . . ."

VTXTS PROGRAM

Mr. **Carl Smith.** Admiral Schoultz, when the Navy briefed the committee last year on the VTXTS program the estimated cost of the program was $5.5 billion.

Could you tell us what the cost is estimated to be this year?

Admiral **Schoultz.** I believe our current estimate is $5.2 billion.

Mr. **Carl Smith.** Does that represent a decrease in the number of aircraft that you projected last year or is that the same number of aircraft for less money than you projected last year?

Admiral **Schoultz.** I think it is the same number of aircraft, Mr. Smith. They did a very in-depth cost analysis on this aircraft with both Douglas and British Aerospace and all of NAVAIR costers and they worked very hard from every angle.

Admiral **Seymour.** It was not submitted in procurement last year, so I don't have anything to compare it with right now. But we can find out. I think it is the same number.

[The information follows:]

The current program cost estimate is based on a procurement of 305 aircraft. This is the same number of aircraft as projected in the program estimate of $5.5B.

THE HAWK

Mr. **Carl Smith.** Admiral, I know that your O5 officers examined very closely the alternatives. Are you aware of any suitable alternatives that would be less expensive than the Hawk?

Admiral **Schoultz.** No, I am not. We have looked at several other options and we are continuing to look at them. We did go back and relook at the competition for this aircraft and looked at those prices.

The Hawk is obviously the cheapest version of anything that was offered with the same capability. We looked at whether we could extend or modify our TA-4's. We are also looking at another way to structure the program possibly going all wet, the carrier's version first, without doing the dry, and our analysis right now is that we are going to continue with the current program. But I have to take it to the Navy leadership and insure what they are going to do.

Mr. CARL SMITH. Is it your opinion that the wet-dry combination will be less expensive than an all-wet force?

Admiral SCHOULTZ. No, but we will get the airplane sooner. We are going to get it when we need it and that is one of the driving factors. That is one of the key things that we are looking at and are coming forward with in the Navy staff, if we can squeak by without buying any more airplanes, to wait for the wet version and do it all in one.

The problem with the wet and dry is that you have two R&D bills. If you can put that all in one, even though there is more money up front, the net cost is cheaper.

Mr. CARL SMITH. It has been suggested that the Navy might wait until the Air Force is ready to replace the T-38 and the Navy and Air Force could join in the program to replace both the T-38 and P-4's and P-2's at the same time with one aircraft.

Would that be possible from the Navy's point of view?

Admiral SCHOULTZ. I haven't heard that suggestion. I heard it the other way around, that the Air Force had looked at the Navy version, to see if they could use the Hawk.

They say no, that they need a supersonic trainer. We don't feel we need a supersonic trainer because the supersonic aircraft is obviously going to be more expensive.

As you know, this is a training weapon system. I cannot speak for the Air Force. They are not strongly interested in the Hawk because of its lack of supersonic capability.

We can't really afford to wait until the midnineties when they look for their replacement. Also, we feel that to buy a supersonic trainer is going to cost us a lot more money than is necessary.

Mr. CARL SMITH. Do you feel that it would be less expensive to buy the Hawk than to buy an aircraft that you and the Air Force might develop together?

Admiral SCHOULTZ. Yes, sir, particularly if it is supersonic.

A-6E

Mr. CARL SMITH. Last year when this committee recommended the termination of the production line of the A-6E transfer of the 75 Marine A-6's to the Navy we ultimately fell off in conference because Secretary Lehman came to the committee and said he needed leverage with the manufacturer of the F-18. He used that leverage to good advantage in the eyes of a lot of people and he got a very nice contract for the F-18 in the 1982 buy.

That argument is certainly persuasive again this year to continue production for that reason. I wonder if, as you suggest, Admiral Schoultz, there is ongoing evaluation to determine the future composition of the airwings. If that study determines that additional

A-6's will be required beyond the 10 attack and 4 or 5 tanker aircraft that are currently in the airwings, it is reasonable to assume that those aircraft will be A-6's as they are now configured?

Is the A-6E in its current configuration a real negotiating lever against the F-18 when it requires more than 50 maintenance hours per flight hour? Also, is the A-6E a credible competitor to the F-18 which has a substantially lower requirement for maintenance and substantially higher reliability figure right now?

Would we have to invest a substantial amount in the A-6 in order to get it up to the performance levels of the F-18 in terms of reliability and maintainability?

If so, could you estimate the R&D bill associated with those improvements, please?

Admiral SCHOULTZ. I might have to answer that in detail for the record. We are planning some maintenance improvements in the A-6.

Besides that we are planning some improvements in the weapon system and we are looking at the entire bill. To ask if we make it comparable with the F/A-18 what the cost of that will be, I will have to take that for the record.

Mr. CARL SMITH. Do you have an estimate?

Admiral SCHOULTZ. We have an estimate from one look we took at it which would build us a new A-6 with a new wing, a new radar, new avionics upgrade, new heads-up display, and a new tail. Basically a whole brand new airplane.

It has a big R&D bill, over a billion dollars if you want to do that, but we don't feel we are going to do that. We feel the airplane the way it is now is an adequate long-range, all-weather bomber. It has a large constituency that will go to the matter to say it is the best in the world. It is our only real heavy load carrying aircraft off the ship.

Right now we are relatively happy with it, but we feel that we do need something to go with it for defense suppression and that is were the F/A-18 strike fighter comes along.

Mr. CARL SMITH. On behalf of Senator Goldwater, we thank you all for coming this afternoon.

General FITCH. I have one point to correct in regard to MRASM. We did check on aircraft limitation of the A-6. The inboard wing station of the A-6E can handle a 2,650-pound asymetric weight on one side.

Mr. CARL SMITH. On behalf of Senator Goldwater, thank you for coming.

The record will remain open until 5 o'clock for additional questions for the record.

[Question with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR BARRY GOLDWATER

AIR DEFENSE

Senator GOLDWATER. The Marines are planning to do with much less air defense than the Army. As I understand it, you plan to have only Stinger and Hawk. The Army plans to have Stinger, Vulcan, Chapparal, Divad, Hawk, and Patriot. Is there an explanation for this divergence in capability?

General FITCH. There is a distinct reason for this divergence and it has to do with the difference between Army and Marine Corps roles and missions. By nature, systems acquired by the Marine Corps must be capable of high mobility as well as being helicopter transportable. This enables us to rapidly project ashore the desired type of force to accomplish an assigned mission. We call this task organization. The Army has developed and procured air defense systems which provide defense in depth to support sustained land combat operations. These systems do not necessarily meet Marine Corps requirements. All of the Army systems which we have not procured are either large in size or on chassis of considerable weight making them less desirable due to our amphibious and tactical lift constraints. Additionally, the PATRIOT system does not meet our mobility requirements as it is considered to be a semi-permanent system once emplaced.

As you have stated the Marine Corps presently plans only two ground air defense systems; IHAWK and STINGER. We also count very highly upon the integration of these missile systems with our fighter/attack aircraft. This integration is accomplished through our Marine air command and control system which directs target assignments for both the airborne and the ground weapon systems.

We are, however, continuously searching for additional systems to meet our specific requirements and improve our air defense posture. One such system being actively sought is an air defense variant of the Light Armored Vehicle (LAV(AD)) which would be highly mobile, meet our lift requirements and provide air defense for our LAV mechanized force.

Senator GOLDWATER. Are you considering improving your air defense capability?

General FITCH. The Marine Corps has embarked upon a program to significantly improve our air defense capability. The Light Antiair Missile Battalions (LAAM Bns) which employ the Hawk system are undergoing a configuration change, called Triad, to increase their simultaneous engagement capability. This program which adds a minimal number of personnel and equipment to each firing battery increases each battery's engagement capability from two to three targets. This transition will commence in fiscal year 1984 as the new equipment items are received. In addition to the configuration change, we are adding a fourth firing battery to each of our two active and one reserve Hawk battalions. The net effect of these changes will be a one hundred percent increase in engagement capability. To meet our requirement to support 3 MAF's and a Div/Wing team, an additional LAAM Bn will be added in fiscal year 1985, providing an additional thirty-three percent increase in overall capability.

Our Forward Area Air Defense (FAAD) units which employ the Stinger and Redeye missile systems have already commenced expansion. In fiscal year 1982 we increased the number of FAAD platoons from one to four in each of our three active duty Wings. In fiscal year 1984 we will complete our FAAD expansion by adding a fifth platoon to each active duty Wing. This will give us a total of 15 active duty platoons and five Reserve platoons. This represents a one hundred-fifty percent increase over our fiscal year 1981 FAAD posture.

Along with our FAAD expansion, we have also commenced transition to the new Stinger Weapon System. Stinger is replacing our aging Redeye stocks and will provide a head-on all aspect engagement capability as well as increased range, altitude and lethality. Stinger is also equipped with a Mark XII IFF feature.

SMALL ASSAULT WEAPON (SMAW)

Senator GOLDWATER. Discuss the SMAW, how does it compare with the VIPER? (Provide details for the record.)

General GLASGOW. The Shoulder-Launched Multipurpose Assault Weapon (SMAW) and VIPER light antiarmor weapon (LAAW), as currently being developed, are totally different weapons. Each weapon has been optimized for its primary use either as a "bunker buster" or as an antitank weapon and is not effective in the other role as described below.

The Shoulder-Launched Multipurpose Assault Weapon (SMAW) is made up of a modified Israeli B-300 83mm antitank rocket launcher which consists of a 9mm spotting rifle, optical sight mount, front hand grip, firing mechanism with hand grip, ground support bipods, shoulder rest and sling. The launcher with standard 4X power optical scope attached, weighs 16.4 pounds and is 30 inches long. The warhead and fuse in its self-contained fiberglass container weighs an additional 13.1 pounds and is 23.1 inches long making the overall weight and length of the ready to fire system 29.5 pounds and 53.1 inches respectively. The maximum effective range of the SMAW is 250 meters.

The weapon will be used to destroy bunkers and to put holes in walls. It will become the primary assault weapon and will replace the 106mm Recoilless Rifle and

M202 multipurpose flame weapon. It will be a single-man-portable, reusable assault weapon for use in the urban environment.

The Viper system, is a short-range (350 meters), man-portable, light, antitank, recoilless rocket weapon which consists of a tactical round and a training system. The tactical round consists of a free-flight in-tube burning rocket, which is packaged and sealed in an expendable launcher that serves as the tactical storage container.

The VIPER tactical system is intended to satisfy an operational requirement for a more accurate, lethal weapon than the current LAAW by providing a higher hit probability, greater lethality, greater effective range, and increased reliability. The weight of the VIPER round is 8 pounds 14 ounces. The weapon, which is a round of ammunition, is designed to be maintenance free, capable of being stored for extended periods of time without significant loss of reliability, and relatively impervious to worldwide environmental conditions.

VIPER

Senator **Goldwater**. As you know, the Army is having a competitive "shoot-off" of various VIPER-type weapons; that competition will begin this spring. Are you interested in procuring something like the VIPER—perhaps to replace the SMAW?

General **Glasgow**. The "shoot-off" you talk about is a Congressionally mandated joint Army/Marine Corps evaluation of Light Anti-armor Weapons (LAAW) as a replacement for our current M72A2 LAAW. Even though the services objectives differ in portability and penetration, it is hoped that as a result of this joint test, a single system can satisfy both services. However, neither the Army nor Marine Corps can make a decision until the testing and evaluation has been completed and the tradeoffs, such as cost effectiveness and portability are weighed against one another. The Shoulder-Launched Multi-purpose Assault Weapon (SMAW) is to be our primary assault weapon and as such has been optimized for its assault role just as the LAAW will be optimized for its anti-tank role. Neither weapon is effective in the other role and therefore, the LAAW is not considered a replacement or substitute for the SMAW.

RADIOS

Senator **Goldwater**. What kind of radios are you buying?

General **Glasgow**. The Marine Corps is continuing previously approved buys in the tactical radio area. Examples of these procurements are the PRC–68, squad level VHF radio, the PRC–77, VHF manpacked radio, and the GRC–160 and MRC–110 vehicular mounted radios.

Senator **Goldwater**. Do you have any secure, anti-jam capability in your field radio systems?

General **Glasgow**. The Marine Corps currently employs VINSON COMSEC to secure the majority of its Very High Frequency (VHF) radio assets. There is no current anti-jam capability fielded. However, the PRC–113 with the anti-jam HAVE QUICK technology is being procured in fiscal year 1983.

Senator **Goldwater**. The Army is about to buy something called SINCGARS which is a secure, frequency hopping radio system which cannot be jammed. Are you involved with the Army's program?

General **Glasgow**. The Marine Corps currently plans to purchase the SINCGARS family of radio equipments. Funding is requested in fiscal year 1986.

TANK PROGRAM

Senator **Goldwater**. Where do you stand on your tank requirements; do you have all you need?

General **Glasgow**. The acquisition objective of our current main battle tank (MBT), the M60A1, is 672 plus 159 for the maritime pre-positioned ships (MPS) commitment. We presently have 646 tanks on hand and expect to receive 70 more in fiscal year 1984 bringing our total to 716 against a total acquisition objective of 831.

Senator **Goldwater**. Are you considering buying the M1?

General **Glasgow**. The Marine Corps is presently reviewing our future roles/requirements for our armored combat vehicles. A portion of this review will include a decision on further upgrades/service-life-extention of the M60A1 or procurement of the M1.

Senator **Goldwater**. Is the M1 suitable for Marine Corps needs?

General **Glasgow**. The Marine Corps has no doubt that the M1 is an effective Main Battle Tank. The M1's suitability for the Marine Corps amphibious mission will be determined by the ongoing review of our armored combat vehicles.

Senator GOLDWATER. I understand you are considering a major upgrade of the M-60 tank. How much would it cost per tank to upgrade the M–60?

General GLASGOW. In an effort to insure we keep the M60A1 at the most economic/effective level of capability the Marine Corps has embarked on an M60A1 product improvement effort. Our initial objective will be to improve the fire control system. Through this we intend to incorporate the best features of the M60A3 and M1 fire control systems into our M60A1. This will be accomplished through repackaging existing components and integrating them into the M60A1. By this our tanks will have better fire control capabilities than the M60A3 and equal capability to the M1 when firing in a stationary mode. In constant fiscal year 1984 dollars the price of this endeavor is expected to be under $150,000 per vehicle.

LIGHT ARMORED VEHICLE (LAV)

Senator GOLDWATER. Are you satisfied with the Army's progress on procuring the LAV?

General GLASGOW. Yes, the Army has worked diligently with us through the joint Project Management Office to insure the earliest possible initial operational capability (IOC) is attained.

Senator GOLDWATER. How many variants of the LAV are you planning? (Providing detailed justification for each for the record.)

General GLASGOW. Our original objective to field eight LAV configurations remains unchanged. The type of configuration and quantity of each is predicated on the needs for a combined arms capability organic to the LAV units we expect to introduce into the Marine Corps. The mainstay of the family will be the LAV(25) which will mount a 25mm automatic cannon in a two-man turret and carry an organic six-man squad. In support of this vehicle mounted squad, the assault gun, anti-tank, air defense and mortar configurations will provide the integrated combined-arms aspect. The assualt gun will provide a versatile/cost-effective direct fire support weapons system to engage a variety of targets outside the capabilities of the 25mm and below those of the TOW missile. The anti-tank (TOW) will provide the heavy armor defeat capability. The air defense system will provide organic mobile air defense capability that can compliment the overall air defense umbrella provided the total force. The mortar vehicle will give the LAV unit an indirect fire capability which is highly mobile. In addition to the firepower support vehicles, a command version will provide the fundamental command and control capabilities needed for the LAV units. A recovery vehicle will provide for the expedient field maintenance and recovery functions required in the vehicle intensive LAV units. The final configuration will be the logistics version which will serve as the basic general purpose vehicle to fulfill the forward logistics requirements.

BRADLEY FIGHTING VEHICLE

Senator GOLDWATER. Do you have any plans to buy the Bradley fighting vehicle?

General GLASGOW. No sir, while we don't question the capabilities of the Bradley fighting vehicle it lacks the amphibious ship-to-shore capability resident in our amphibious assault vehicle the LVT7A1.

MULE

Senator GOLDWATER. Compare the capabilities of the MULE versus the GLLD. Why are you buying the MULE?

General GLASGOW. GLLD and MULE are as follows:

	GLLD	Mule
Weight	58.3 lbs	41.5 lbs.
Beam divergence	0.31 milliradians	0.25 milliradians.
Maximum designation range:		
Stationary target	5,000 meters	3,500 meters.
Moving target	3,000 meters	2,000 meters.
Maximum rangefinding	10,000 meters	9,900 meters.
Range:		
Rangefinding error	±5 meters	±10 meters.
Power	100 millijoules	80 millijoules.
Wave length	1.06 microns	1.06 microns.
Optics	13 power	10 power.

The MULE is designed to designate point targets for laser-guided weapons, designate area targets for acquisition by airborne laser trackers for aerial delivery of conventional munitions (such as TOW), and accurately locate targets for attack by field artillery and naval gunfire, firing conventional munitions. The MULE has the capability to more accurately locate targets by use of both the North Finding Module (NFM) and laser designator rangefinder module (LDRM). GLLD does not have the NFM capability. The modular design of MULE allows the system to be employed in a hand-held mode and allows the system to be transported in a sling type configuration rather than backpacked. GLLD cannot be employed in a hand-held mode. The Marine Corps extensively reviewed the capabilities of GLLD and other laser designators before deciding to procure MULE. The MULE completely meets our Marine Corps requirement for transportability, hand-held employment and target location and the GLLD does not.

F/A-18

Senator GOLDWATER. Admiral Schoultz, on pages 13 and 14 of your classified statement, you refer to the ejection seat situation with the F/A-18 and state that lead time requirements preclude incorporation of a new seat in the fiscal year 1983 buy of F/A-18's. What lead time requirements do you project for procurement, manufacture, and qualification testing? One of the potential competitors claims that the Navy's lead times are greatly exaggerated. What is this firm omitting in their calculations, if anything? Do you disagree with their contention?

Admiral SCHOULTZ. The lead time requirements projected for procurement, manufacture, and qualification testing were initially submitted in accordance with the 1983 Appropriations Act. As contractor furnished equipment, it established the first through the third quarters of fiscal year 1983 for procurement preparation. Source selection will occur during the fourth quarter of fiscal year 1983 and the first quarter of fiscal year 1984. Development and testing will follow from the second quarter of fiscal year 1984 through the second quarter of fiscal year 1986. Production seat delivery is programed to commence in the third quarter of fiscal year 1986. Aircraft deliveries, with the new seat, will follow during the fourth quarter of fiscal year 1986. Seat procurement as government furnished equipment would delay production seat delivery until the third quarter of fiscal year 1987 and aircraft delivery with the new seat until the fourth quarter of fiscal year 1987.

The program as outlined provides for a thorough evaluation and expedient incorporation of the selected seat in the F/A-18. I cannot comment on exactly what one of the potential competitors is or could be omitting to justify their claim that the Navy's lead times are greatly exaggerated.

MARINE CORPS PROCUREMENT

Senator GOLDWATER. Your procurement account is down substantially from last year—over $100 million not counting the impact of inflation. Why?

General GLASGOW. The Marine Corps fiscal year 1983 procurement budget had been significantly increased by OSD during the final stages of budget development in order to enhance the Marine Corps readiness and sustainability posture. The assessment of Marine Corp's requirements for fiscal year 1984 led to a budget submission slightly below the fiscal year 1983 level but consistent with a balanced budget submission.

Senator GOLDWATER. Will this have any effect on your readiness?

General GLASGOW. We do not anticipate adverse effects on readiness.

LAV

Senator GOLDWATER. Provide for the record your procurement plans (5-year program) for the LAV.

General GLASGOW. The following procurement profile shows the total LAV program as contained the Selected Acquisition Report (SAR) of 31 December 1982:

[Dollar amounts in millions]

	Current and prior years (fiscal year 1982–83)	Budget year (fiscal year 1984)	Balance FYDP (fiscal year 1985–88)	To complete beyond FYDP	Total
Amount	$143.2	$87.6	$297.6	$87.8	$616.2
Quantity	194	113	347	90	744

TILT ROTOR

Senator GOLDWATER. General Fitch, what operational advantage does the tilt rotor have that would be available from either an upgraded inventory helicopter or an advanced helicopter?

General FITCH. Aside from the fact that the joint Services' technical assessment indicated that a tilt rotor design is the only technical approach which will meet the defined needs of all the Services, a finding which industry advised us that they concurred in, a tilt rotor offers the following advantages over either an upgraded or new design advanced helicopter:

First, far greater range due to beneficial impact of wingborne flight and the blending of turboprop efficiencies with rotary wing hover capability. JVX will carry 24 troops in excess of a 200 nautical mile radius or alternatively, transport 10,000 pounds of cargo over 110 nautical miles.

Second, greater speeds for both sustained cruise flights and for dash to improve reaction times for combat rescue and other emergency operations. Coupled to this speed capability is the ability to maintain high speed during combat maneuvering primarily due to the superior ability of winged aircraft in this regime. JVX will outspeed threat attack helicopters and provide an impressive maneuver envelope for high speed, low altitude flights as a defense against successful targeting by enemy air defense weapons. JVX will cruise at 250 knots and withstand four Gs during combat maneuvering.

Third, the combination of range, high cruise airspeed and sizing for hover with 10,000 pound payloads will yield enhanced transport productivity, or troops and cargo moved per nautical mile per hour, during the most crucial phase of our power projected mission. . . the amphibious assault as well as during more routine tasks such as logistic sustenance of forces afield. This capability will enable positioning of naval task forces at increased standoff from anti-ship threat operating from land bases of coastal vessels. Coupling with the ICAC program and overall improvements in the speed of naval shipping, greater surprise and speed for raids, special operations and reconnaissance-in-force operations will provide a major increase in sea-based power projection capabilities. JVX will fit on board all existing and planned amphibious aviation ships.

Finally, the tilt rotor's unique characteristics will result in a quantum increase in the Nation's strategic mobility for conventional forces. JVX will be designed to routinely self-deploy, without need for aerial refueling, over 2,100 nautical miles without restrictions on flight in moderate icing conditions. It will be able to fly from the East Coast to Norway in 14 flight hours, from the West Coast to Hawaii in 10 hours and from our bases in North Carolina to bases or shipping in the Persian Gulf or Gulf of Oman in 26 flight hours. Designed for shipboard compatibility, on arrival at those locations it can be immediately available for tactical operations from assault shipping or marry-up to airlifted troops and maritime prepositioned stocks for operations from land bases. JVX will provide a new dimension of rapid strategic responsiveness and tactical flexibility with conventional infantry forces that would not be possible with either existing or advanced helicopter technology.

A–6 AIRCRAFT

Senator GOLDWATER. General Fitch, you refer, in your statement, to the all weather close air support capability of the A–6 aircraft. In my view you are describing an interdiction role rather than a true version of close air support in the classic sense. In considering the variety of attack aircraft already in the Marine Corps inventory, and the associated logistical trail of each type, why couldn't the Navy A–6 force support the Marine requirements for all weather operations?

General FITCH. In response to the question of using Navy A–6 aircraft to meet the Marine Corps requirement, I will review the Marine Air Ground Task Force requirement, explain how the A-6 fills this need and discuss the reasons why this should be done by Marine A-6s.

The Marine Air Ground Task Force concept is based on the ability to organize for a specific purpose. As a light infantry, the Marine Corps has come to rely on tactical aviation to provide the necessary combat power multiplier essential to win on the modern battlefield.

Through both close and deep air support, Marine air supports the ground commander. Close Air Support (CAS) is by definition closely integrated with the fire and maneuver of the ground element in much the same way as artillary would be. Deep Air Support (DAS), beyond the fire support coordination line, does not require the same level of integration; however, it does complement the ground commander's scheme of maneuver. Both CAS and DAS are needed 24 hours per day and during all weather conditions.

The primary use of the A-6 is close air support under night and all weather conditions; however, the aircraft is also well suited for DAS missions. The combination of the A-6E TRAM and the AN/PPN-19 RABFAC radar transponder results in the unique ability to deliver highly accurate fire power that is fully integrated with the ground commander's actions. To date, no other Marine aircraft can do this, nor do the Navy or Air Force aircraft, that are capable of using RABFAC, train enough with the Marines to be proficient.

The Navy A-6 aircraft and crews are obviously capable of conducting all weather CAS operations; however, these aircraft will be in great demand by the Amphibious Task Force Commander or Joint Task Force Commander for long range interdiction missions in addition to the war at sea role key to carrier battle group employment. There is also the issue of responsiveness. Carrier based A-6 aircraft are constrained by deck cycle times, distance from the amphibious objective area and conflicting demands; all of which would impact on their availability to provide responsive CAS for the ground commanders.

The final issue is training. The Marine Corps experience is that Marine Air provides the best support for the ground commander. Marine training focuses on the command and control procedures that provide the detailed level of integration in CAS. The combination of the Marine aviator forward air controller with his RABFAC, the Direct Air Support Center with the communication capability to coordiante the air support and the Marine pilot with his understanding of the ground commander's problems, is the optimum way of providing timely, effective CAS any time and anywhere it is required.

AV-8B

Senator GOLDWATER. General Fitch, what weapons will the Marines use with the AV-8B for close air support missions and how many can be carried on each sortie? How many tanks or other hard targets can the AV-8B kill, per sortie, with those weapons loads? Attack helicopters could carry 8 to 16 Hellfire laser guided missiles per sortie and kill 6 to 12 tanks per sortie at a much lower cost in fuel used and in dollar cost of the weapons. Would you provide the results of any studies which you have done on the cost and effectiveness of using attack helicopters for the ground loiter close air support mission?

General FITCH. The AV-8B is capable of delivering a wide range of conventional air to ground weaponry. For the close air support mission the aircraft will be loaded with munitions appropriate for the specific targets encountered by the ground force. Among the AV-8B weapons compatible with close air support tasks are:

MK-80 series bombs, (high & low drag, plus laser guided); MK-20 Rockeye, (all cluster munitions); MK-77 Napalm; 2.75" and 5" forward firing rockets; AGM-65E Laser Maverick; and 25mm Gun.

The weapons can be carried in multiples and in combination. The Stores Management Set (SMS) is programmed to the specific load and mix selected for a mission and provides input to the mission computer to ensure correct and safe release intervals are provided to the pilot. Consequently the pilot may quickly and effectively adapt his attack to situation and terrain and provide maximum weapons effectiveness as well as improving his survivability margin.

The combinations and permutations of possible stores are extremely high, but for example, in addition to the 25mm hi-velocity GAU-12 gun, the AV-8B can carry up to 16 MK-82's, or 12 MK-20 Rockeyes, or four Laser Mavericks. The number of hard targets, such as tanks, an AV-8B could kill per sortie would depend entirely on circumstances. If targets appeared frontally, singly, as in a shooting gallery, the AV-8B would be able to kill four with a load of Laser Mavericks. If they were grouped, massed or concentrated on a road, a concentrated pattern of Rockeyes might destroy scores. More significantly, the AV-8B can attack any target in the close air support target list including troops in the open, troops entrenched or deployed in fortifications, artillery, vehicles—soft and armored, boats, or bridges. Because of its high subsonic speed, the fixed wing aircraft can employ its versatile armament across the Forward Edge of the Battle Area (FEBA) and engage enemy elements shielded from direct fire by obstructions or terrain.

Attack helicopters have a much narrower role. Although extremely effective against frontally exposed point targets, they have little or no capability against a wide range of close air support targets. Much slower than fixed wing aircraft, the helicopter must use terrain to mask itself from defensive systems. During an amphibious operation, helicopters operating over the sea may be critically exposed. However, the attack helicopter's effectiveness can be multiplied when its relatively light weight, "hit to kill" system is integrated with the heavy punch delivered by coordinated fixed wing aircraft.

The Marine Corps trials and studies indicate the combination of forward based V/STOL systems is of much greater value than components of attack helicopters or AV-8B employed independently. For that reason, the requirements to upgrade the Marine Corps Cobra attack helicopter force and continue the transition to an all-V/STOL light attack force of AV-8B's have been given high priority.

AV-8B WEIGHT LIMITATIONS FOR VERTICAL LANDINGS

Senator GOLDWATER. General Fitch, we are told that the AV-8B has a weight limitation for vertical landings, and it cannot land vertically at any weight above 17,500 pounds, if it meets its specifications. Is that correct?

The AV-8B's empty weight is listed at 12,750 pounds. Adding 1,400 pounds for the gun, ammunition, and two Sidewinder missiles brings that weight up to 14,150 pounds. This leaves 3,350 pounds available for fuel and ordnance when the AV-8B makes a vertical landing at a forward pad, as is proposed when using ground loiter while waiting for a call to do close air support. Since 3,350 pounds of fuel and ordnance for a combat mission and return to base is a minimal amount, the AV-8B will have to be refueled and armed at that forward pad. This will require substantial logistical support at those forward pads. How many tons of supplies, fuel or bombs, would have to be moved to those forward pads and how do the Marines intend to handle this logistical problem?

General FITCH. The vertical landing performance specification for the AV-8B is 17,500 lbs. on a "tropical day" at sea level. On days cooler than 89°F the aircraft will be capable of hovering and landing with higher gross weights. For instance at 70°F an AV-8B will be capable of landing vertically with 18,550 lbs., increasing the useful payload by 1,050 lbs. As cited in the Committee's question, however, the aircraft is restricted by the thrust available during purely vertical evolutions. That is why the aircraft is operated in a short take-off and vertical landing (STOVL) mode over 90 per cent of the time. Utilizing a short take-off, an AV-8B can lift its full fuel and ordnance capacity at any temperature, and after delivering the weapons and using the fuel, land vertically either aboard ships or at forward bases.

If, however, the operational scheme of maneuver includes vertical operations from sea platforms or austere sites, loads will be matched to requirements. The only constant weight factor is the basic aircraft weight, about 1,300 lbs. All ordnance, including the 25mm gun pack and Sidewinder missiles, are role equipment and can be removed. On hot days or at higher altitudes, an ordnance load tailored for a single pass attack, such as four MK-20 Rockeye bombs, may be the only weapons carried.

Again, if to meet operational requirements, the commander desires to take advantage of the surprising fact that the aircraft can lift more in a vertical take-off than it can carry during a vertical landing, supply and replenishment of fuel and/or ordnance to the forward site must be addressed. Of course, if the aircraft were operated from sea platforms, resupply would not be an issue as fuel would be available on board. Ashore austere forward sites will be established in secure areas on or near existing logistic supply routes. Fuel or ordnance will not normally be provided as the "site" is conceptually a staging or ground loiter position, but should it be required, it would be provided by routine resupply means. In the majority of scenarios trucks would deliver the limited quantities required to augment the load carried by the AV-8B. Helicopters could provision these sites, one CH-53E providing enough fuel and/or ordnance in 8 hours to sustain six AV-8B's operating from three sites for 2 days.

The Marine Corps has operated the AV-8A for 12 years and tested its basing concepts thoroughly, and they work. The Marine Corps has within its structure the means to effectively employ and support the AV-8, just as it supports other expeditionary elements. Finally, the AV-8B represents an improvement over the AV-8A in performance, in load capacity and most importantly in wespons effectiveness. For the same logistic cost the AV-8B is far more effective than its predecessor.

AV-8B FLIGHT TESTING

Senator **Goldwater**. General Fitch, the AV-8B currently is in development flight testing. What problems have been experienced in achieving the desired combat speeds or in acceleration to combat attack speeds doing close air support maneuvers? Is lack of speed and acceleration a serious deficiency for your planned combat missions?

General **Fitch**. The AV-8B has completed 65 percent of its Full Scale Development (FSD) program. No high risk technical problems have been identified, but early in the FSD program a deficiency in specific excess power, "Ps" was noted by both technical and tactical evaluators.

As a consequence, the aircraft in its FSD configuration is approximately 20 knots slower than predicted and at high combat speeds does not accelerate as well as desired.

When the evaluations were completed six months ago, the airframe and engine development was far from complete. Since that time the contractors have researched the problems of aerodynamic drag, thrust related drag and reduced net propulsive force at high power setting. Progress has been made in reducing drag and the engineers are continuing developmental improvement. The phenomenon of thrust-related drag, in jet flow interference with the airframe, has been documented and test hardware is being incorporated to minimize its effect. Finally, the engine manufacturer has provided data that indicates operational thrust levels may be safely increased in the interim FSD Pegasus engine, the F-402-RR-404A, to provide performance equivalent to the power available in the engine designated for full production, the F-402-RR-406, the production version currently under test in the United Kingdom.

During the periods of cool ambient temperatures, the AV-8B already has the capability to exceed minimum performance levels required to perform its combat functions. With the reduced drag and increased thrust provided by ongoing development those performance standards will be achieved during hot weather and will establish the production AV-8B as an outstanding close air support combat aircraft.

DOUBLE RANGE PAYLOAD FOR AV-8B

Senator **Goldwater**. General Fitch, the F/A-18 is reported to have double the range-payload of the AV-8. It will also have a laser designator so that it can self-designate its targets as well as an excellent air-to-air fighter capability so it can do both the fighter and attack missions. Is that a correct comparison of the two aircraft?

General **Fitch**. Comparisons of the AV-8B and the F/A-18 have been conducted for years by the Marine Corps, Navy and OSD. In terms of range and payload, the two aircrafts are roughly equivalent, dependent on specific ordnance loads and mission profiles. Each aircraft has an accurate weapons delivery system; the AV-8B is equipped with the passive Angle Rate Bombing System (ARBS) and the F/A-18 employs an active radar system.

As an integral part of the ARBS, the AV-8B has a laser spot tracker for use in coordination with ground or airborn designators. The F/A-18 has provision for a sophisticated FLIR/laser system that significantly enhances its mission effectiveness in the attack and interdiction mode.

But today, as in previous analyses, the most cost effective force for the Marine Corps mission is a balanced mix of F/A-18's and AV-8B's. The AV-8B continues to possess the critical advantage of basing flexibility and improved responsiveness to requests for close air support when compared with any CTOL aircraft, especially when the attack weapons systems are of an equivalent effectiveness. It has been successfully optimized for its light attack mission just as the F/A-18 has been optimized to perform the dual missions of fighter/attack.

FORCE STRUCTURE

Senator **Goldwater**. General Fitch, as I understand it, the current Marine Corps force structure plan for TACAIR is to have 12 squadrons of F/A-18's, each with 12 planes, or 144 total U.E. You will have 8 squadrons of AV-8B's, each with 20 aircraft, or 160 total U.E. Also you intend to build up the attack helicopter force to 3 squadrons of 24 aircraft each, or 72 U.E. Why are you going to have the preponderance of your close air support aircraft in AV-8B's? Would it be worthwhile to take another look at the mix of these forces, considering the potential inherent in attack helicopters and in the Multi-mission capabilities of the F/A-18, as compared to the limitations and lack of flexiblity of the AV-8B?

General **Fitch**. The force structure and mix of the Marine Corps Aviation is a crucial element of the combat potential of the Fleet Marine Force. The structure proposed in the fiscal year 1984 budget represents the most balanced, cost/effective combat capable mix attainable within the limits of current fiscal constraints.

The ratio of F/A-18s, AV-8Bs and attack helicopters was determined by analysis of procurement and operating costs, commitments, deployability, missions, effectiveness and combat attrition. The AV-8B with its fixed wing capability to introduce heavy aviation ordnance onto the battlefield from a flexible, helicpoter-like basing system is uniquely suited to the expeditionary amphibious mission assigned to the Marine Corps. The 160 light attack aircraft requested are the minimum to fill the commitments assigned to the Marine Corps by operational plans. Deletions of or substitutions for the AV-8B would incur unacceptable shortfalls in acapability or equally unpalatable cost increases due to compensatory force level increases of other types.

When the modernization and transition to F/A-18s, AV-8Bs, and improved Cobra attack helicopters is complete, the Marine Corps will have achieved an unparalleled flexibility to deploy and sustain combat operations.

Questions Submitted by Senator John W. Warner

F-14

Senator **Warner**. Would additional funding, particularly R&D funding, enable you to move more rapidly or do you prefer to follow your established plan?

Admiral **Schoultz**. We would prefer to follow our established plan with regard to R&D funding and an orderly block update of the F-14.

Senator **Warner**. Admiral, I submitted a question to the Secretary of the Navy when he was before the committee recently, and this question related to the upgrade of tactical air forces at sea. I have not received that response as yet; however, I want to follow up with you.

A dozen years ago, when I was in the Navy Secretariat, we started production on the F-14A. We were only going to buy about 39 F-14A's, and then we were going to bring on a new engine. We planned a new avionics system by the mid-1970's. Neither has materialized.

As I understand the threat to our forces during the late 1980's—land or sea—by Soviet bombers with standoff missiles, it seems to me that we need to get on with this upgrade. What is the Navy's plan to move forward with this upgrade?

Admiral **Schoultz**. The Navy is currently evaluating the requirement to procure an alternate engine for the F-14, to be installed in production aircraft in the late 1980's time frame. However, it should be noted that, regardless of the decision on a new engine, the Navy must and will continue to pursue the TF-30 CIP to insure availability of engines for those F-14's already in the inventory. The TF-30 is the only engine available to the F-14 for at least the next three years; and it will continue to power several hundred F-14's for the rest of this century, since it was never our intention to backfit all F-14's with a new engine.

The current F-14 avionics package is a 1960's technology analog system. It is very adequate for today's requirements. As far as a new avionics system is concerned, we are now in a system definition phase to develop the most cost-effective options for block upgrades to the F-14. An Avionics Integration Program (AIP) and a Radar Improvement Program (RIP) are being reviewed and could be ready for production in the late 80's/early 90's time frame. These programs provide improved radar capability and permit integration of new digital technology systems such as JTIDS and AMRAAM into the F-14 weapon system.

A-6

Senator **Warner**. What can you tell us about the Navy's plans for future upgrade of this weapons system?

Admiral **Schoultz**. Specific configuration changes for the A-6 are still under investigation. The goal of the upgrade program is to provide increased mission effectiveness, increased survivability, increased operational readiness (increased reliability, reduced maintenance man-hours per flight hour), and increased landing gross weights (increased come-aboard with high value weapons, fuel). Updated aircraft will replace current A-6E filling an inventory shortfall which begins in fiscal year 1987.

Senator Warner. Is there some vehicle—such as multiyear contracting—that would prove beneficial to the Navy as far as future buys are concerned?

Admiral Schoultz. The Navy is currently reviewing an A-6E multiyear procurement proposal submitted by Grumman.

U.S.S. "JOHN F. KENNEDY" DEPLOYMENT

Senator Warner. I am advised that the aircraft carrier *Kennedy* is going on deployment with only A-6 attack aircraft on board—no light attack. Does this kind of deployment give you greater flexibility in meeting operational requirements, and do your procurement plans provide you with sufficient A-6 aircraft to meet this flexibility.

Admiral Schoultz. Coincident with the fleet introduction of the F/A-18, a program for evaluating the best composition of carrier air wings by varying the mix of F-14, F/A-18, and A-6 aircraft was formalized and put into operation commencing this fall in U.S.S. *John F. Kennedy. Kennedy's* air wing will evaluate the effectiveness of an all A-6 and F-14 air wing with the A-6 filling all attack missions. During the next evaluation phase, U.S.S. *Constellation* will deploy with the first operational Navy F/A-18 squadrons assigned as direct replacement for existing A-7 light attack squadrons. Results of these operational evaluations will be used to determine optimum air wing composition with out-year F-14, F/A-18, and A-6 procurement requests adjusted accordingly. The existing A-6 procurement is sufficient to support the current force level requirements and conduct the evaluation.

Senator Warner. Are you satisfied with the A-6E or is there a requirement to upgrade this aircraft in the future?

Admiral Schoultz. The A-6 is an outstanding attack airplane and the only true all-weather attack aircraft in the inventory. The aircraft is adequate against today's threat, but it will have to be upgraded to survive against the threat of the 1990's and early 2000's.

Senator Warner. Admiral Schoultz and General Fitch, last year there was some controversy about continuing A-6 aircraft production. What are your views on continuing the procurement of the A-6?

Admiral Schoultz. The Navy needs to continue producing the A-6 in order to meet attrition, provide a mobilization capability, and provide some competition for the other attack aircraft. To help alleviate the cost of a low production rate, a multiyear procurement contract is being evaluated.

EARLY WARNING/ELECTRONICS WARFARE

Senator Warner. Is there not a need to upgrade the early warning and electronics warfare aircraft this time, time frame too?

Admiral Schoultz. The need to continously upgrade our early warning capability is recognized. We have, in being, an upgrade program for the E-2C aircraft which is being carried out in two phases. The first phase, scheduled for completion in 1986 includes a fourfold increase in computer processing capability, improved radar surface surveillance, and a reduction in the radar's susceptibility to jamming. The second phase, acheduled for completion in 1988, will extend the search radar range to nearly double its present capability.

For our EA-6B electronic warfare (EW) aircraft, we have had an ongoing program since its fleet introduction in 1971 to update the EA-6B EW system and jamming capabilities to counter the everincreasing and sophisticated enemy threats. In 1973 the aircraft was modified to the Expanded Capability (EXCAP), which significantly increased its frequency coverage. Then, in 1976, the Improved Capability (ICAP I) aircraft was developed, which made needed changes to the receiver system and cockpit layout. Our newest version, the ICAP II aircraft, will be introduced into the fleet in 1984 and contains a significant improvement in our jamming capabilities with the new universal exciter. Additionally, we are now designing a new receiver processor group for the EA-6B, which will be able to function in the high pulse density and complex signal environment projected for the 1990's. This EA-6B version will be called the Advanced Capability (ADVCAP) and is scheduled for fleet introduction in 1990.

QUESTIONS SUBMITTED BY SENATOR EDWARD M. KENNEDY

T-34 TRAINER

Senator KENNEDY. Admiral Scholultz, what would be the impact on the training fleet if T-34 procurement were to be deferred such that no aircraft would be purchased for fiscal year 1984?

Admiral SCHOULTZ. There would be no immediate impact on the Training Command. If the 1984 lot were delayed, it would delay our planned modernization of our Recruiting Command support aircraft from the old T-34B models to the T-34C by a year or more. It is difficult to assess the impact on aviation recruiting that this might have.

The real impact of the deferral of the fiscal year 1984 production lot will be financial. The longer line break—the cold line start-up from stored tooling, on top of a steeper learning curve penalty from the additional 1-year delay—will result in an estimated net cost increase of approximately $10 million over the last three years of production. The increase could go even higher if the prime contractor's vendors were to also incur production line interruptions as a result of this action.

Senator KENNEDY. Admiral Schoultz, will the T-34 production line have to be reopened to produce the aircraft you have requested in fiscal year 1984?

Admiral SCHOULTZ. Senator Kennedy, we do not expect that we will see a classic case of the line being completely shut down and then reopened. We expect that it will be more like a temporary interruption in production.

Last September, Beech Aircraft requested that the Navy take delivery of the T-34C's, authorized and appropriated in our 1981, 1982 and 1983 programs, on an accelerated time table. They requested this because of economic conditions and slowed down orders for their other commercial lines of aircraft and they wanted to avoid work force layoffs by increasing the production rate of our T-34's. This also helped the Navy because, with the new T-34C's coming into our inventory faster, we could accelerate the retirement of our old T-28's which are very difficult to support.

With the faster delivery of our 1981, 1982, and 1983 lots, there will be a gap in production between the last 1983 aircraft and the first aircraft of the fiscal year 1984 lot. Under this expected delay in production, the final assembly line for our T-34C's will be temporarily suspended while production on other models and the parts for them will continue. Beech Aircraft does not intend to actually break down the T-34C line for this period but will just inactivate it in place. Workers in the T-34C line will either be assigned to other aircraft or be laid off for the interim period. Our Naval Air Systems Command is working right now to minimize the disruption and any attendant price increase that this temporary line gap will create.

ANNUAL AIRCRAFT REQUIREMENTS

Senator KENNEDY. Admiral Schoultz, last year Admiral McDonald testified that, based on a force of 12 carrier air wings, 150 fighter and attack aircraft would be required to replace attrition losses and modernize the force. This figure of 150 is at odds with a figure of 180 aircraft needed each year—derived in a February 1979 study by the Congressional Research Service (CRS). Admiral Schoultz, what is the required level of annual procurement to replace losses and to maintain an average age of 8-9 years for a Navy/Marine Corps fighter and attack force based on 12 carrier air wings? How do you reconcile the difference between this level of procurement and the CRS figure of 180 aircraft per year? Does the difference between the two figures (150 vs. 180) mean that the Navy is accepting a higher average age level than it did in 1979?

Admiral SCHOULTZ. The Navy analysis of the required annual aircraft procurement to support the current force structure of 12 carrier air wings, 3 Marine Corps air wings, 24 patrol squadrons, and the support/training/Reserve/LAMPS squadrons indicates approximately 325 aircraft are required per year, of which 150 are fighter/attack. The 1979 CRS study quoted a 1978 OSD analysis which concluded approximately 180 new aircraft are needed annually. The difference between the two numbers relates to the assumption on service life. The 180 aircraft per yer rate assumes a 15 year service life which results in an average age of about 7.5 years for fighter/attack aircraft. The 150 aircraft per year rate uses actual service life, or about 18 years, which results in an average of about 9 years for fighter/attack aircraft. The Navy has had to institute programs to extend the service life of the inventory to maintain force structure as compensation for fiscally constrained procurement, with the result of increasing the average age of the force beyond the 8 to 9 year target.

F/A-18

Senator **Kennedy**. Admiral Schoultz, is it the Navy position that, in actual flight test, the F/A-18 has met the requirement for combat radius of 550 nautical miles in the attack configuration?

Admiral **Schoultz**. Operational tests and fleet instructor cadre training flights have demonstrated that the F/A-18 has a nominal unrefueled combat radius of action on an operational interdiction mission of 450 NM. This mission radius meets the fleet's operational needs as verified by the Chief of Naval Operations and is termed the unrefueled operational interdiction radius of the F/A-18.

During F/A-18 aircraft development, a notional interdiction mission profile was included in the Decision Coordinating Paper (DCP) and as a specification in the development (and each subsequent procurement) contract. The DCP and contract specification profiles are derived from the operational mission but require achievement of optimum flight parameters on all segments of the mission profile, assume standard day atmospheric conditions, and simulate carrier and target area procedures with a set of prescribed, fuel-consuming flight maneuvers. The aircraft is assumed to start with all tanks completely full and empty external drop tanks are considered jettisoned enroute. The contract specification calls for carriage of the Forward Looking Infrared (FLIR) and Laser Spot Tracker (LST) pods while the DCP does not. Because of the optimization assumptions involved, it was never intended that the DCP and/or specification mission profile would be actually flown (or even could be flow) in its entirety. Instead, as is customary in aircraft development, a series of instrumented test flights sampling each profile segment would generate data which, in combination, would provide an engineering estimate of the radius achievable. Based on such tests, the Naval Air Systems Command estimates the DCP interdiction radius is 575 NM and the contract specification radius (with FLIR/LST) is 525 NM. The DCP has shown an interdiction radius threshold value of 550 NM since 1974, and the Naval Air Systems Command estimate continues to exceed this threshold (by 25 NM). The specification radius in each contract has varied from a maximum value of 618 NM to the current (fiscal year 1982) 525 NM as the design trade-offs are made to maximize range within cost and performance constraints. The minimum acceptable radius value, using the DCP parameters, has always remained 550 NM (without FLIR/LST). It is the Navy position that the F/A-18 interdiction combat radius meets the DCP threshold.

Senator **Kennedy**. Do you expect that on attack missions fleet pilots can routinely fly the aircraft to a 550 nautical mile radius? Why would fleet operations differ from the mission profile implicit in the 550 nautical-mile requirement?

Admiral **Schoultz**. It is expected that fleet pilots operating from aircraft carriers will be able to routinely attain the operational combat radius of 450 nautical miles and, when shorebased, will be able to increase this since lower fuel reserves will be required.

Senator **Kennedy**. Admiral Schoultz, please provide for the record a breakout of the 1,366 aircraft total for the F/A-18 program in terms of:

Unit equipment: Navy fighters (active), Navy light attack (active), Navy fighters (reserve), Navy light attack (active), Marine Corps fighters, Marine Corps attack; training; support; maintenance pipeline; other (specify).

Admiral **Schoultz**. The breakdown of the 1366 program into its various elements is as follows; however, the utilization of F/A-18's to fill light attack inventory requirements will not occur before Secretary of Defense approval for production of the aircraft for that mission. Additionally, the Marine Corps attack requirement is no longer a segment of the F/A-18 program.

731 unit equipment: [Deleted] Navy fighters (active), [deleted] Navy light attack (active), [deleted] Navy fighters (Reserve), [deleted] Navy light attack (Reserve), [deleted] Marine Corps fighters (active), [deleted] Marine Corps fighters (Reserve), [deleted] Marine Corps TAC(A) (active), [deleted] Marine Corps reconnaissance (active), [deleted] Navy reconnaissance (Reserve); 115 Training; 19 Support; 117 Maintenance pipeline; 384 Attrition.

The 1366 program will support the force structure as indicated through fiscal year [deleted].

AVERAGE AGE

Senator **Kennedy**. Admiral Schoultz, in his posture statement, Secretary Weinberger stated the Navy fighter and attack aircraft should maintain an average age of 8 to 9 years. What is the current average of the Department of the Navy's fighter and attack fleet?

Admiral **Schoultz**. The average age of the Department of the Navy's fighter and attack fleet is 11.4 years.

ANNUAL PROCUREMENT

Senator **Kennedy**. What would the annual procurement requirement be for Navy/Marine Corps fighter and attack force levels based on 13, 14, and 15 carrier air wings and on 8 to 9 years average life?

Admiral **Schoultz**. Approximately 150 fighter/attack aircraft are required annually to maintain the current force of 12 Navy carrier air wings and 3 Marine Corps air wings with an 8 to 9 year average age. An additional 7 fighter/attack aircraft would be required per year to support each additional air wings, or 157 for 13 air wings, and 164 for 14 air wings, which is the current Navy objective.

MARINE CORPS SQUADRONS

Senator **Kennedy**. Admiral Schoultz, how many F/A-18's would be required to equip just active Marine Corps fighter squadrons with the F/A-18 and provide sufficient aircraft for: Unit equipment; training; support; maintenance pipeline; advanced attrition?

Admiral **Schoultz**. A total of 312 F/A-18 aircraft would be required to equip only the 12 active USMC fighter squadrons and maintain them for 15 years as indicated:

Unit Equipment	
Training	144
Support	30
Pipeline	6
Attrition	24
	108
Total	312

Mr. **Carl Smith**. The hearing is adjourned.

[Whereupon, at 4 p.m., the subcommittee adjourned, subject to the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1984

MONDAY, MARCH 21, 1984

U.S. SENATE,
SUBCOMMITTEE ON TACTICAL WARFARE,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

AIR FORCE TACTICAL PROGRAMS

The subcommittee met in executive session, pursuant to notice, at 9 a.m., in room SR-232A, Russell Senate Office Building, Senator Barry Goldwater (chairman) presiding.

Members present: Senators Goldwater and Bingaman.

Staff present: Carl M. Smith and Robert S. Dotson, professional staff members; and Tamara L. Farnsworth, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; Matthew Murray, assistant to Senator Kennedy, and Ed McGaffigan, assistant to Senator Bingaman.

OPENING STATEMENT BY SENATOR BARRY GOLDWATER, CHAIRMAN

Senator GOLDWATER. Gentlemen, we are a little early, but we will come to order.

I apologize for the fact that the attendance is not any better than it is, but we just left another meeting on strategic and nuclear forces and meetings are going on all over the place.

The Tactical Warfare Subcommittee meets today to receive testimony from the Air Force on their fiscal year 1984 budget request. Here to present that testimony are Lt. Gen. Lawrence Skantze, Deputy Chief of Staff for Research, Development and Acquisition; Maj. Gen. William Gorton, Director of Operational Requirements; Maj. Gen. James Marshall, Director of Development and Production; and Brig. Gen. Tom Baker, Deputy Director of Operations.

Gentlemen, it is a pleasure to have you with us this morning. Before you begin I would like to mention a few issues in which this committee has considerable interest.

First, we remain concerned over the number of Air Force tactical aircraft we are procuring. Our requirement—just to maintain the current force structure—is somewhere around 250 aircraft per year. Last year we procured only 159. This year the request includes just 168.

At this rate, not only are we unable to grow the force structure toward the goal of 40 Tactical Fighter Wings, but we are forced to retain our oldest and least capable aircraft in the inventory. And we are doing this at a time when the Soviets are building their fighters at a rate that would completely modernize our entire tactical Air Force in just 17 months, although I notice in this morning's paper that the Soviets have reduced their production of tactical aircraft. I don't know whether to believe it or not because I don't necessarily look upon the Washington Post as another edition of the Bible, but nevertheless that figure was there and you might look it up for your own interests.

Second, the committee expressed concern over the rising cost of the Lantirn program last year. At that time the total program cost had risen to $1.8 billion. This year, I understand the number of pods to be procured has more than doubled, and so has the price.

There are other issues, such as the dual role aircraft, advanced tactical fighter, derivative fighter engine and advanced communications, to name just a few—we didn't mention the Enforcer—in which this committee has a considerable interest. I expect you will address each of these programs in detail, except the one I mentioned.

Gentlemen, we welcome you and look forward to your testimony.

Senator, do you have any comment to make?

Senator **Bingaman**. I don't have any at the moment, Mr. Chairman. I am here to hear their testimony.

Senator **Goldwater**. You have some mighty important tactical air bases in your State.

Senator **Bingaman**. I am sure we do.

Senator Goldwater. We want to make sure we don't do anything to embarass you.

Senator **Bingaman**. I appreciate that.

Senator **Goldwater**. General Skantze, please proceed.

STATEMENTS OF LT. GEN. LAWRENCE A. SKANTZE, U.S. AIR FORCE, DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT AND ACQUISITION; ACCOMPANIED BY MAJ. GEN. WILLIAM A. GORTON, U.S. AIR FORCE, DIRECTOR OF OPERATIONAL REQUIREMENTS; MAJ. GEN. JAMES H. MARSHALL, U.S. AIR FORCE, DIRECTOR OF DEVELOPMENT AND PRODUCTION; AND BRIG. GEN. JAMES A. BAKER, U.S. AIR FORCE, DEPUTY DIRECTOR OF OPERATIONS

General **Skantze**. Good morning. I appreciate this opportunity to present to you our planned research and development program for the tactical Air Force.

We have a number of programs to present to you this morning.

Senator **Goldwater**. Pardon me, gentlemen, you don't have to read your statement. If you would like to breeze through it, we will insert everything in the record.

General **Skantze**. This is just a couple of brief comments I would like to make as introduction.

Senator **Goldwater**. Proceed.

General **Skantze**. Mindful of that fact, I brought with me two statements for the record which will be submitted. The first is the total Air Force budget request for fiscal year 1984 and the second is an executive summary of the tactical air warfare portion of the fiscal year 1984 budget request.

Here with me today is Maj. Gen. Jim Marshall, my Director of Development and Production and Maj. Gen. Bill Gorton, my Director of Operational Requirements, as well as Gen. Jim Baker from Plans and Operations.

General Gorton is prepared to provide you with a detailed insight into our fiscal year 1984 tactical warfare program.

Before we start General Gorton's briefing, I would like to highlight a few key programs in this important defense area.

The subcommittee is well aware of the continuing numerical disadvantage and diminishing qualitative advantage which confronts the United States. As a result of major investments made in the late 1960's the Soviets have placed six new series of advanced fighter aircraft into operational service since 1970.

Soviet fighter aircraft production has averaged an impressive 1,260 per year over the last 5 years, about 3 times our production.

In addition, the Soviets have systematically implemented state of the art technology into many systems. As an example, Soviet technological advances have permitted the development and fielding of four new air-to-air missiles and seven new air-to-surface missiles.

All these missiles have exhibited longer ranges, increased reliability and increased accuracy. The Soviets are more capable than ever before. The situation has forced us to revisit the capability issue as it relates to our tactical forces.

Consequently, Secretary Orr and General Gabriel have both placed high priority on modernizing and expanding our tactical forces to counter this undiminished Soviet growth in both the quality and quantity of their conventional forces.

A very detailed examination of our current capabilities against the burgeoning Soviet threat has revealed a number of critical deficiencies in our tactical forces, deficiencies that require our immediate attention if we are to preserve our capability to protect our national interest throughout the world.

One such critical requirement is the need to modernize and expand our tactical air-to-surface capabilities. To this end we are pursuing the development of a family of modern weapons and a dual role fighter with an enhanced air-to-surface capability to supplement our aging fleet of F-111 fighter aircraft used for interdiction.

This dual role fighter will be a two-seat version of either the F-15 or F-16. While maintaining an excellent air-to-air capability this fighter will possess an increased air-to-surface lethality and longer payload range than our F-4 aircraft. It has been abundantly clear to us that in light of the air-to-surface combat ranges required in Southwest Asia as well as Central Europe, we are deficient in numbers of long-range interdiction aircraft.

To deny the enemy the sanctuary he now enjoys at night and in bad weather, we are also pursuing the development of programs that will incremently enable our fighter to operate effectively in all environments. The Low Altitude Navigation and Targeting Infrared System [LANTIRN] which uses state of the art infrared sensors will greatly expand the operating envelope of our fighters by permitting night operations and it is the No. 1 air-to-surface tactical Air Force's priority.

The Soviet Army units are fully equipped for night combat and practice it regularly. We must be capable of denying them this enormous combat advantage. Our ability to operate at night has the added benefit of dramatically increasing our aircraft sortie capability by a factor of up to three through a 24-hour period.

We have looked exhaustively at other alternatives to achieve a night warfare capability and our analysis shows clearly that LANTIRN is the most cost-effective system.

Programs like the Precision Location Strike System [PLSS] which can provide all-weather detection and strike capability to attack enemy electronic emitters will further enhance our ability to defeat the enemy in all-weather environments.

Expanding and modernizing our current fighter force is also a top priority. With the F-15 Eagle and F-16 Falcon, we currently have the two finest tactical fighters in the world in production. We are continuing to enhance their capabilities with modifications that permit the most effective use of our aircraft.

The addition of an Advanced Medium-Range Air-To-Air Missile, AMRAAM, to our air-to-air weapons inventory will act as a force multiplier due to the flexibility it offers our fighter pilots. However, we still are facing an increasingly sophisticated combat threat which makes it desirable to keep both fighter lines open and to expand our present force structure.

While committed to this expansion we are also well aware that we must not ransom our future by concentrating on the present threat. In this regard we continue to study advanced fighter technology concepts to insure we maintain our current technological edge.

Again, it is a pleasure to be with you today. We welcome the opportunity to share our views with the committee and with that I will ask General Gorton to give his briefing if there are no questions at this point.

[The prepared statement of Lieutenant General Skantze submitted for the hearing record appears on p. 2203.]

Senator GOLDWATER. Before you proceed, General, because it is not in this year's budget request, what is the Air Force proposing to do about the new program request that came across for the A-10?

General SKANTZE. We have submitted the documentation to OSD in order to take on the reprograming issue and Secretary Weinberger has not chosen to act on that at this point.

Senator GOLDWATER. In other words, you don't intend to buy any more A-10's?

General SKANTZE. It is not our preference to buy any more A-10's. We responded to the direction by sending the appropriate paperwork down to OSD to respond to the congressional direction, but it has not been acted upon. We think we have a sufficient A-10 force at this point.

Senator GOLDWATER. I do, too, but the Secretary of Defense has not acted on that request yet?

General SKANTZE. That is correct, sir.

Senator **Goldwater**. Are there any indications as to what he might do?

General **Skantze**. I have no idea at this point.

Senator **Goldwater**. I wonder if you could send out a message to Secretary Weinberger that we do not want that aircraft continued. I believe we have 740 in the inventory.

General **Skantze**. Something like that, 707.

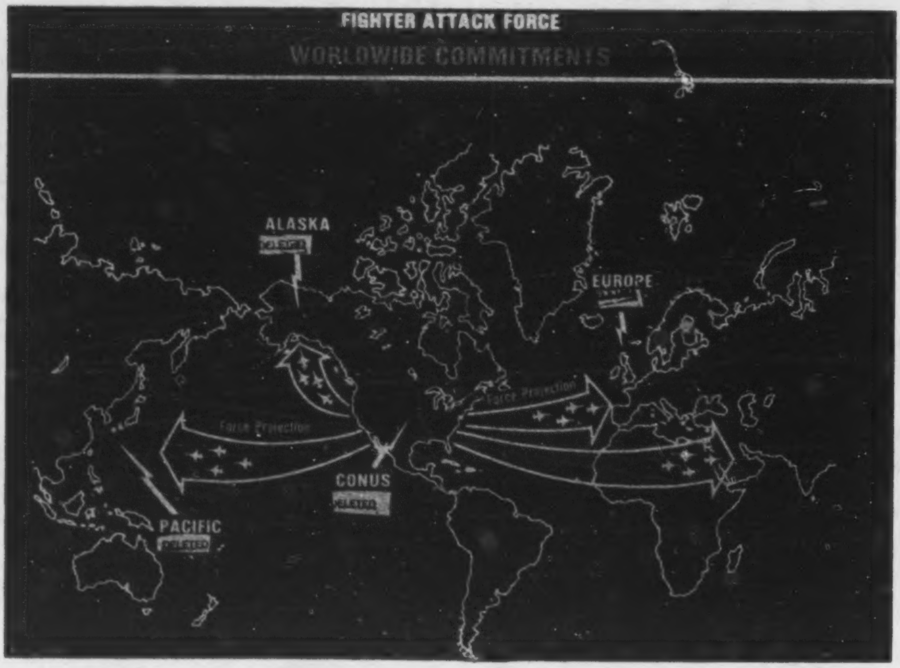
Senator **Goldwater**. It is a hell of a good airplane when you are fighting the Boy Scout troops, but it is needed right now.

General **Skantze**. Yes, sir; we feel we have a sufficient number.

Senator **Goldwater**. Let our staff know. We don't have to make it a matter of record yet. Thank you, General.

General **Gorton**. Mr. Chairman, with your indulgence, I would like to take a few moments to briefly overview our tactical forces. Then at the termination of this briefing we will be prepared to go step by step through each program and answer any questions you may have.

As you are well aware, the tactical forces are made up of four major commands, PACAF, Pacific forces, USAFE, European forces, TAC and AAC, also the National Guard and Reserve. These are the major commands that support the tactical forces. They are commonly referred to as "The TAF".



While we train and equip our forces, we emphasize that they must be prepared to deploy worldwide. Not only just to Europe, although we have placed a great deal of emphasis on that very key area, but our forces are trained and equipped to be able to deploy worldwide.

Senator **Goldwater**. Pardon me. Are you going to explain those numbers like "Alaska [deleted]"?

General **Gorton**. Yes, sir. Those are the number of fighter aircraft located permanently in Alaska.

There are [deleted] fighters in the Pacific Air Force fighters, the major force being in the Conus. Our largest force is overseas in Europe.

Senator **Goldwater**. Only [deleted] in Europe?

General **Gorton**. In place, U.S. fighters.

Senator **Goldwater**. Are those mostly F-15's and F-16's?

General **Gorton**. A mixture of F-4's, F-111's, A-10's, F-15's, and 16's.

Senator **Goldwater**. The F-111 is a fighter?

General **Gorton**. Yes, sir; it is part of the tactical fighter forces.

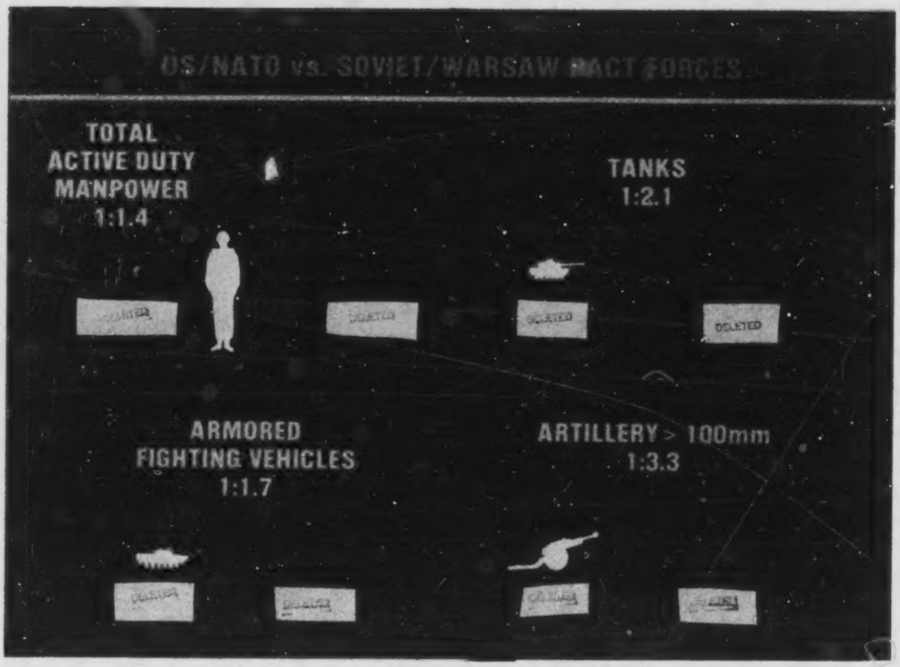
Senator **Goldwater**. OK.

General **Gorton**. We will take a look at that European balance now, sir.

BALANCE OF AIRPOWER
IN-PLACE FORCES
NORTHERN REGION
DELETED
DELETED
CENTRAL REGION
DELETED
SOUTHERN REGION

What this slide shows in Europe in the filled in parts of the bar is the contribution of the major powers, U.S.S.R. and United States of America, balance of in-place forces. The hatched areas are contributions of the allies by region. Included in our figures are also the Navy and Marine fighters. These are the in-place forces that will be there at the start of a war if it were a bolt out of the blue.

However, there are other forces in the Soviet Union, almost [deleted] fighter aircraft that could be deployed in some portion to augment their forces as well as our deployment to augment our forces. That is where we are today, the in-place forces.



The ground threat is also formidable. This chart depicts the contribution of the NATO-Warsaw Pact forces, 1.4 to 1 in manpower, 2.1 on tanks, and so on. This is a significant force we are facing in place in Europe today.

Senator GOLDWATER. That is not getting any better, is it?

General GORTON. It is not, sir. We are modernizing our forces as well as our NATO allies with the introduction of the F-15, but so are the Soviets. They are doing quite a bit in terms of modernizing their forces and we will talk more about that.

Senator GOLDWATER. Senator, don't hesitate to ask questions.

Senator BINGAMAN. In all these comparisons is France not counted as part of NATO?

General GORTON. France is not counted as far as in-place forces.

Senator BINGAMAN. How would that change it? Significantly?

General GORTON. I don't have the specifics.

Senator BINGAMAN. Do you have any idea?

General GORTON. We can get that for the record, sir. They do have tactical forces, of course, both fighters and medium bombers as well as a nuclear complement.

Senator BINGAMAN. I think that would be interesting.

Senator GOLDWATER. Would you make that available for us, place.

General GORTON. I can, sir.

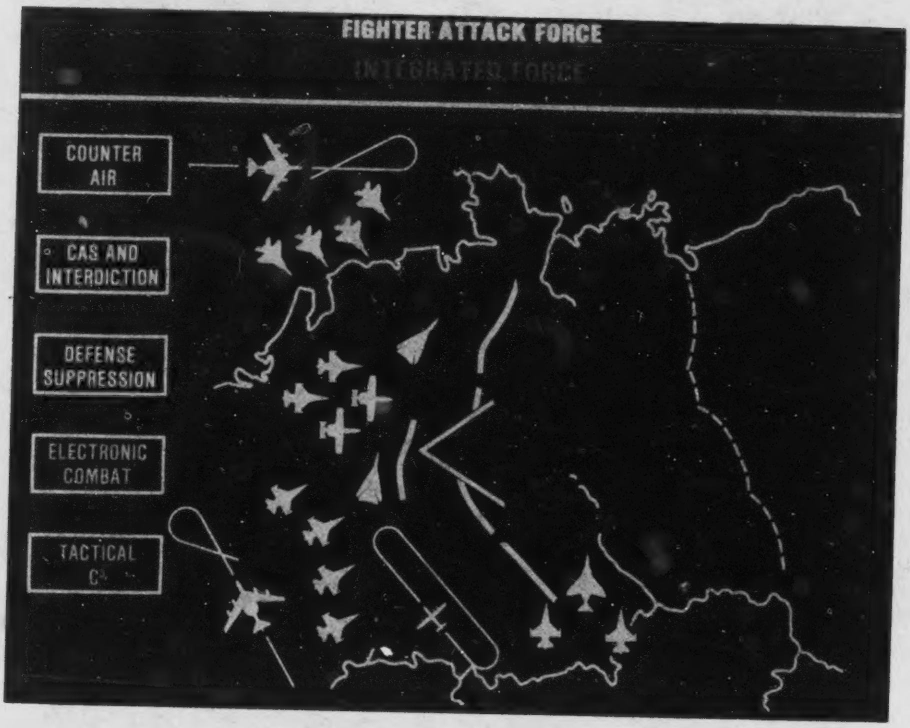
[The information follows:]

FRANCE AS PART OF NATO

The inclusion of French forces in NATO/Warsaw Pact force comparisons changes the force ratios, but in most categories the Warsaw Pact still retains a significant edge. The following data compares forces in-place in Central Europe.

	Warsaw Pact	NATO	France	Warsaw Pact: NATO	Warsaw Pact: NATO and France
Division					
Ground personnel					
Tanks			Deleted		
Tactical combat aircraft					
Combat helicopters			Deleted		
Land based INF aircraft					
INF missiles (MR/IR/SLBM's)			Deleted		

Of course, France does not participate in NATO military planning, and we do not know the circumstances which would cause France to commit its forces to combat.


FIGHTER ATTACK FORCE
INTEGRATED FORCE
COUNTER AIR
CAS AND INTERDICTION
DEFENSE SUPPRESSION
ELECTRONIC COMBAT
TACTICAL C³

General **Gorton**. We have watched how he trains and how he is equipped. We know there will be a combined force that will attack. We know he will move quickly and conclude that war as rapidly as possible.

In order to defend against that we will first rely upon our C^3 forces to give us prior warning as to its buildup. Then we need to move quickly to blunt his air power. At the same time we will be devoting forces to provide close air support for the U.S. Army as well as interdiction forces to take on the second echelon. We will need defense suppression forces to meet air-to-air and also air-to-ground and electronic combat is becoming an increasing portion of our capability, one to cut down his communication.

In short, all the programs that are built into the tactical forces work together as an integrated face to hopefully be able to overcome the numerical imbalance.

FIGHTER ATTACK FORCE OBJECTIVE

Improve readiness and sustainability of existing forces while maintaining a balance with essential modernization and force structure increases to fight outnumbered and win.

Mr. Chairman, the budget that is before you today for tactical forces was built on these objectives. Our primary emphasis was to improve our readiness and sustainability. At the same time we need to modernize our forces and we are doing that while maintaining a balance. It is a modest force growth. All of that to fight outnumbered and win.

[Chart deleted.]

We will look at the Soviet fighter aircraft. Ten years ago it was basically an air defense force. Today it has substantial offensive capability represented in the Mig-23 and -27 air-to-air and air-to-ground. The Foxbat and particularly the Foxhound have a limited lookdown-shootdown capability.

The SU-24 Fencer, an aircraft that not only looks alike the F-111, but has the same capability in range and payload, a significant threat to our rear bases, and a new addition, is the SU-25 Frogfoot.

[Deleted.]

Senator **Goldwater**. What is the top speed, climb, and altitude?

General **Gorton**. It is smaller than the A-10 [deleted.]

[Deleted.]

Senator **Goldwater**. It is a ground support airplane?

General **Gorton**. It is basically a ground-support aircraft. It has a [deleted]. It has a [deleted] than the A-10.

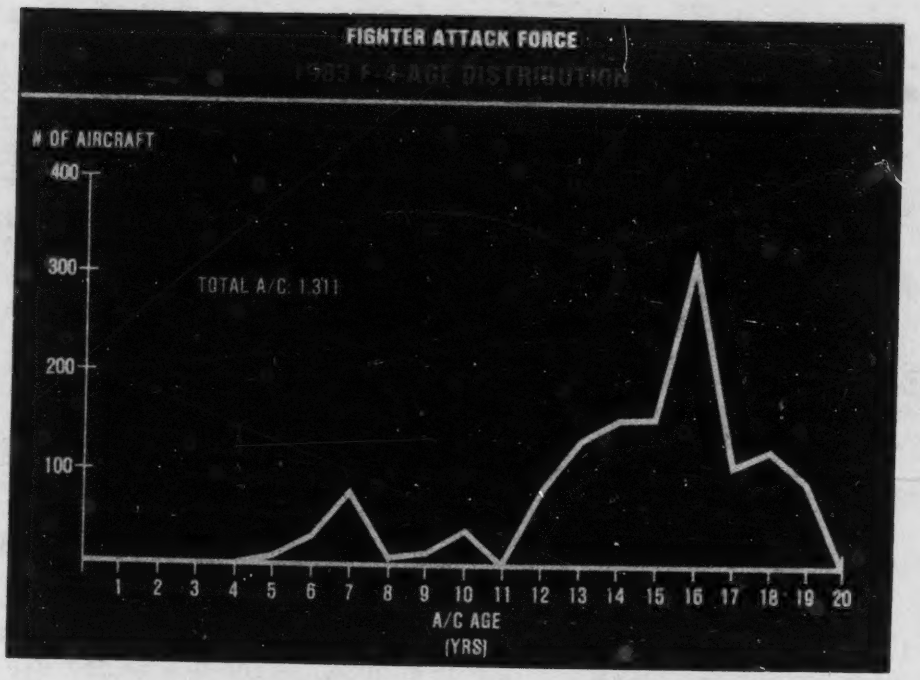
[Chart deleted.]

Another way to look at that force structure, this chart depicts the Soviet tactical fighter wings, [deleted] wings. Each silhouette represents 72 aircraft wing equivalent. As you can see, the Mig-23-27 force which did not exist in Vietnam is basically replacing the Mig-21's.

The green are primarily air-to-surface.

[Chart deleted.]

Our forces I know you are familiar with. The F-15 and F-16, excellent aircraft that General Skantze has already talked about. We still have a preponderance of F-4's in our forces, basically the main fighter during the Vietnam war. Each silhouette is a 72-aircraft wing equivalent, 36 wings, and the colors here indicate those forces in the Reserve, the orange being the Reserve Forces, a well equipped and highly trained reserve force.



As you note, there is a large number of F-4's in that current force today. When we break out that F-4 component, you find that was bought in a block, basically in Vietnam with an average age of 15.8 years today. That is of concern to us. Our fighter force structure today averages about 9 years. The Soviets have historically over the last 7 or 8 years held to about [deleted] and we see no change in that.

Senator GOLDWATER. That old? What is their oldest active fighter now?

General GORTON. The Mig-21, sir, is their oldest active fighter.

Senator GOLDWATER. That is their oldest?

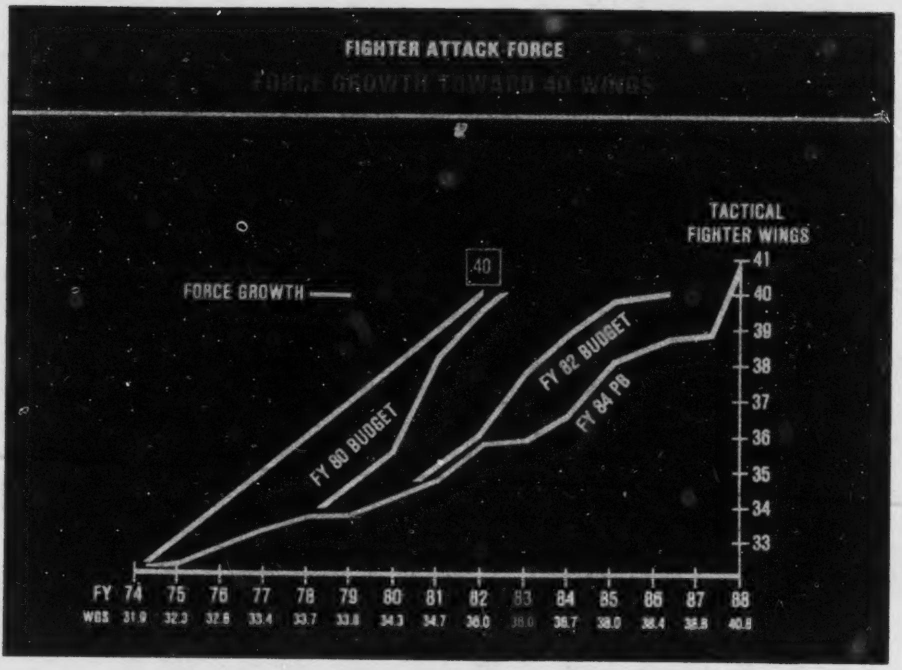
General GORTON. Yes, sir, I will have to check that. There may be some SU, the earliest Mig-21's I think would be the oldest ones, but I would have to take that for the record. There may be a couple of varieties, fighters that might be older, but they are rapidly replacing those.

[The information follows:]

OLDEST ACTIVE FIGHTER

The MIG-21 Fishbed J (IOC 1968) is the oldest air-to-air fighter assigned to an operational Soviet unit. The Tu-128 Fiddler (IOC 1966) is the oldest operational fighter-interceptor and the Su-7 Fitter A (IOC 1961) is the oldest operational fighter-bomber.

As I said, age is important, particuarly when you think about fighter aircraft of which a lot of these have been in combat and we refer to that as a block obsolescence that we need to deal with as we proceed on in the outyears in our budget.



As you mentioned, Mr. Chairman, the 40-wing goal was established for growth back in 1974 when we introduced the F-16. This is our track record in trying to achieve that 40-wing goal. Today we have 36 wings and we are attempting to move on out in the President's budget to the outyears to finally achieve that goal. Here is what has happened on the budget math.

The 1980 budget did attempt to get it in later than the 1982 timeframe. The 1982 budget puts it out to 86 and the budget today puts it on out to 88, a lower rate of production than anticipated to reach that goal in 1982.

[Chart deleted.]

That is what the force will look like if the President's 1984 budget is approved and the FYDP with it. By 1988 we will have a little over 40 wings. The major introduction will be F-16's, but we still have a greater number of F-4's.

Senator GOLDWATER. Is that about the ratio that the Air Force likes? Ratio not numbers. What I am interested in is the growing number of F-16 wings compared to the number of F-15's.

General GORTON. As you know, the F-16 is a swing fighter. We are making modernization throughout the period in the F-16 to enhance particularly air-to-air capability with the introduction of AMRAAM and we are making other modifications in the aircraft in light of the threat it will be confronting in that timeframe.

The ratio we are showing here is a balanced force at the 40-wing level.

Senator GOLDWATER. What percentage of the wing structure of the F-16 will be the new F-16?

General GORTON. The block 25 I don't have that specifically, sir, but we can take that for the record.

[The information follows:]

PERCENT OF WING STRUCTURE

When we reach our 1988 goal of 40 wings, approximately 3.6 of those wings will be Block 25 F-16's (F-16C/D) or 9 percent of the tactical force. That number will continue to increase to 12 wings in 1993 with additional deliveries of F-16's. Of the total F-16's delivered thru 1988, 585 or 42 percent will be F-16C/D. By 1993 assuming F-16's are still being produced at 180/yr, 1,380 F-16C/D's will have been produced (that number should be decreased by the number of F-16E aircraft produced should the F-16E be the dual role fighter selection) of 64 percent of the total F-16 fleet.

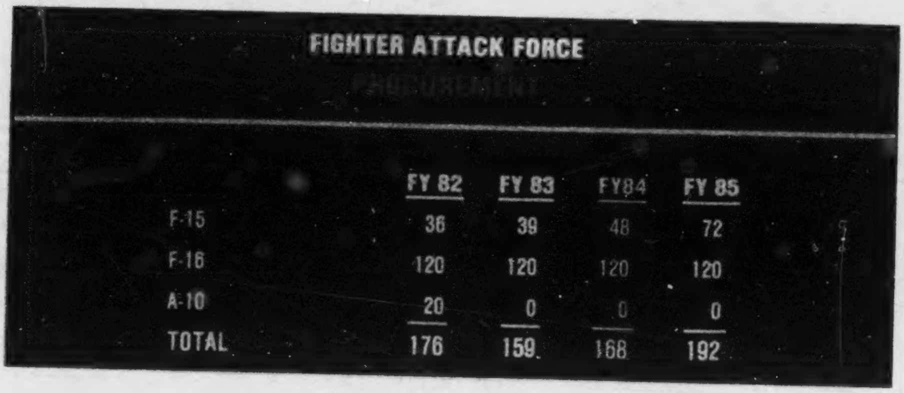
Senator GOLDWATER. I would like to have that. That should be the dominating model, should it not?

General GORTON. I believe so.

General SKANTZE. It starts with No. 785 on out. So it should be the predominant one.

I might also note, Mr. Chairman, if we got the additional 3½ wings of dual role fighters that they would augment those 2¾ F-111 wings we have and that would provide more robust long-range interdiction capability. We are currently limited with the F-111's and they are overcommitted.

General GORTON. That request is not added to that force structure. It would be either part of the F-15 or F-16 production shown depending on which one is selected.

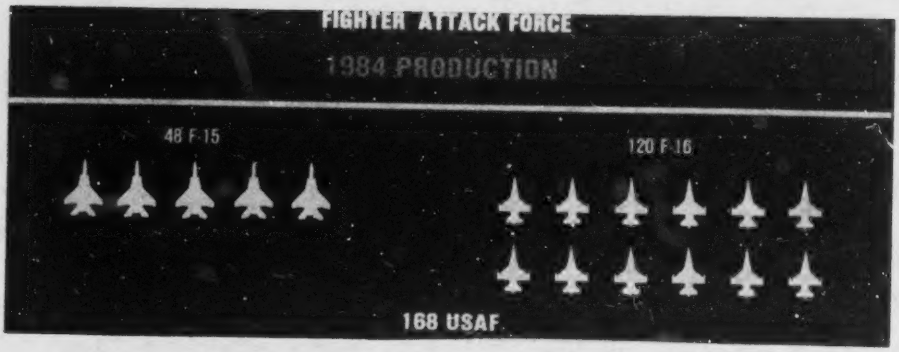


FIGHTER ATTACK FORCE

PROCUREMENT

	FY 82	FY 83	FY84	FY 85
F-15	36	39	48	72
F-16	120	120	120	120
A-10	20	0	0	0
TOTAL	176	159	168	192

Another way of looking at our procurement here is what has happened over the last few years with the President's budget highlighted, as you pointed out, 168 aircraft today.

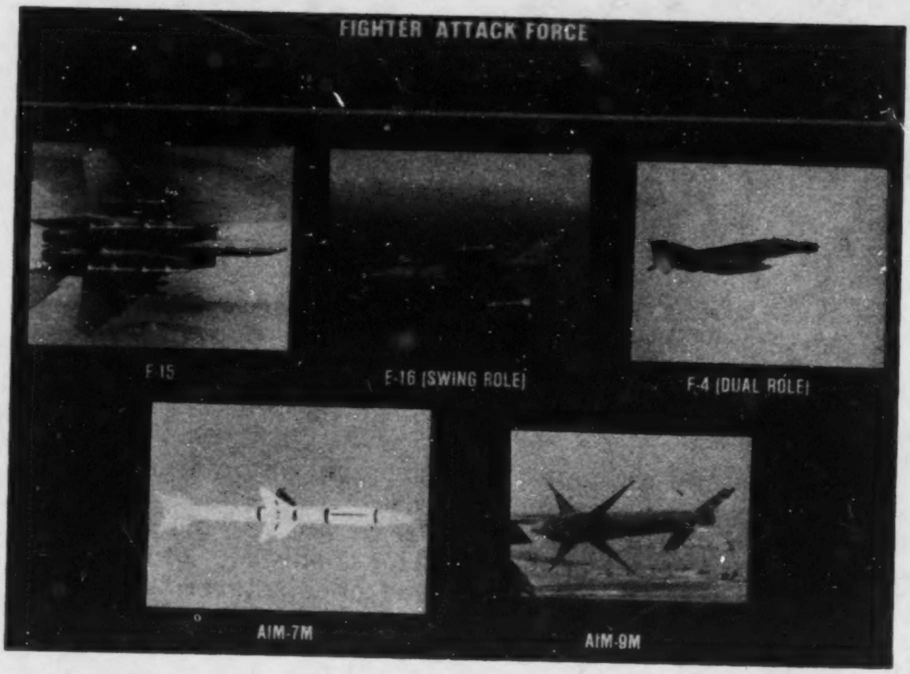


Another way of looking at that procurement, these silhouettes represent 10 aircraft of the various categories, 48 F-15's and 120 F-16's.

This is what we estimate the Soviets will be producing in that same year just in Mig-23's and Mig-27's.

You pointed out in your opening remarks, Mr. Chairman, with regard to Soviet fighter production. This is only Mig-23 production. You are correct, the Soviet fighter production is tapering off slightly. They have been running at 1,250 a year and the reason they are tapering off is because of the introduction of three basic new aircraft, the Frogfoot which was introduced last year and two other aircraft that we will talk about that will be introduced next year.

Overall, if you compare that to U.S. fighter force's production, including the Navy and Marines, in 1984 the budget request is approximately 310 fighter aircraft.



Very briefly, we will take a look at the various categories and where we are modernizing. These are our basic air-to-air forces with the F-16 being Swing and our current missile, AIM-7M. The program before you increases that capability with the first procurement fund for AMRAAM.

Also AIM-9M up above.

[Chart deleted.]

Here are the two new fighters I talked about. The Mig-29 Fulcrum and SU-27 Flanker. These aircraft are said to be introduced next year, in quantity by the end of the decade. They are excellent aircraft, they have capability very similar to the F-15 and F-16. Their energy and maneuverability envelopes are very comparable and the advantage we now have with both the F-15 and F-16 will be significantly eroded by these two new aircraft.

Senator GOLDWATER. What is the thrust-to-weight ratio of the F-15 and the F-16?

General GORTON. Close to 1 to 1.

Senator GOLDWATER. That is what I thought.

General GORTON. This is [deleted] on the 29 and over [deleted] on the Flanker, as I recall.

Senator GOLDWATER. The F-15 and F-16 are at least that good and probably a little better.

General GORTON. As far as thrust goes. We have looked at the intelligence that we have on the engines. These are very large engines in both of these aircraft that will give them a high thrust-to-weight ratio. It is very hard to predict at this stage of the game, but our intelligence information indicates they will be comparable particularly in maneuverability to both the F-15 and F-16.

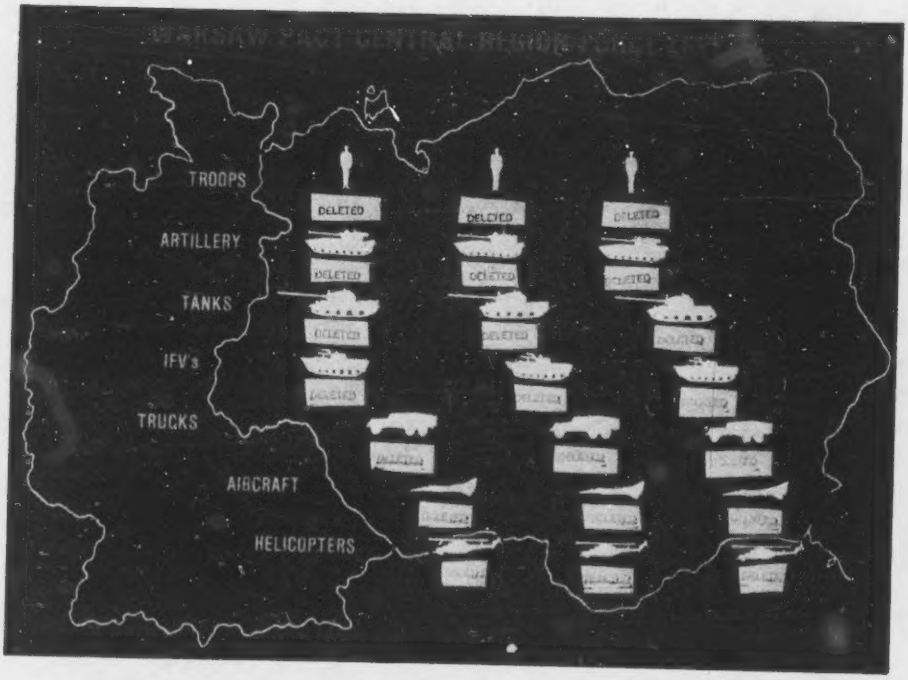
On certain parts we still will retain an advantage, on other parts they will have an advantage.

Senator Goldwater. It looks like [deleted].

General Gorton. I think both aircraft are [deleted].

FIGHTER ATTACK FORCE
F-4
F-16
F-111
A-7
A-10
LGB
30 MM GUN POD
MAVERICK

Looking at our air-to-surface forces, here is the current force today with some of the weapons that we are reflecting. You are familiar with those. We are making some modest improvements particularly in Maverick, the double IR Maverick, 30-millimeter gun pod and some of our submunitions.



This is the ground threat that we would expect in a Soviet-Warsaw Pact engagement. With our air-to-surface forces not only will we be taking them on at the front, but we'll be taking on the second echelon.

In the air-land battle context it has been stated clearly that taking on the second echelon is an essential thing to do if we are going to win the battle at the front end.

Senator GOLDWATER. Let me ask you a question.

General GORTON. Yes, sir.

Senator GOLDWATER. I know this goes back a long time, but suppose on M-day the Soviets use tactical nuclear weapons against our air bases and we don't retaliate.

What does that do to our chances?

General GORTON. In that specific context, if they were to use nuclear weapons against our air bases and we did not retaliate, we would have a difficult job in doing anything of significance to the Soviet forces in Europe.

Senator GOLDWATER. I remember in the war games that came out we could not survive more than [deleted].

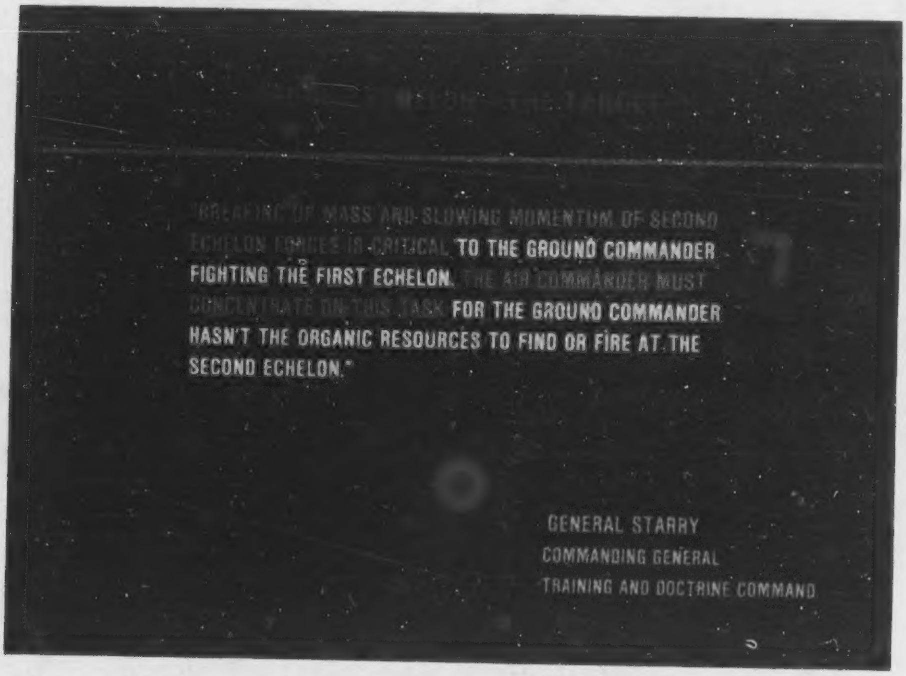
General GORTON. If the point of your question is with regard to nonretaliation, that is the significant point.

Senator SKANTZE. The whole thrust of our air base survivability program is geared toward a conventional attack, runway repairs, and those sorts of things. If it were a tactical nuclear attack, I think we would lose a lot of airfields. I don't know quite how we would respond to that.

Senator GOLDWATER. You still have to await a decision by the President before we can use tactical nukes to retaliate?

General SKANTZE. And I assume the NATO nations as well.

General **Gorton**. I know you know General Starry, commander of REDCOM. This is what he says about the importance of taking on the second echelon.



[illegible] ECHELON—THE TARGET

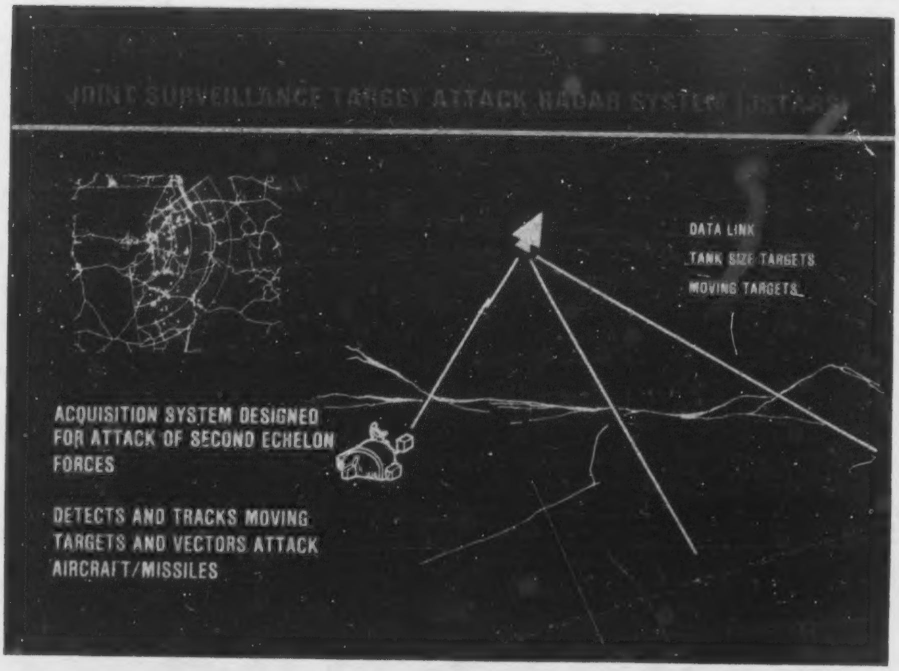
"BREAKING UP MASS AND SLOWING MOMENTUM OF SECOND ECHELON FORCES IS CRITICAL TO THE GROUND COMMANDER FIGHTING THE FIRST ECHELON. THE AIR COMMANDER MUST CONCENTRATE ON THIS TASK FOR THE GROUND COMMANDER HASN'T THE ORGANIC RESOURCES TO FIND OR FIRE AT THE SECOND ECHELON."

GENERAL STARRY
COMMANDING GENERAL
TRAINING AND DOCTRINE COMMAND

General **Gorton**. We acknowledge that and are working to achieve our capability to do that very important task.

Senator **Goldwater**. That new manual that he wrote is the greatest improvement in our warfare literature, I think, that we have had in 100 years. It is a remarkable document. It takes us out of the days of General Custer and moves us up to the present time. That certainly is the guts right there, the guts of what we have to do if we are going to have any chance at all.

General **Gorton**. Yes, sir.



JOINT SURVEILLANCE TARGET ATTACK RADAR SYSTEM (JSTARS)

ACQUISITION SYSTEM DESIGNED FOR ATTACK OF SECOND ECHELON FORCES

DETECTS AND TRACKS MOVING TARGETS AND VECTORS ATTACK AIRCRAFT/MISSILES

One of the programs we have is the Joint Surveillance Target Attack Radar System, JSTARS. The best way to look at this system is that it is to the ground battle, what the E-3A is for the air battle. It will be able to pinpoint and locate the key elements of the Soviet second echelon so that we can attack them in a coherent and effective way.

WHY NIGHT?

Failure to equip our Tacair Forces with a night capability would:

Deny our ground forces the around-the-clock support they need from Tacair.

Ignore the technology edge we now have in hand to provide Taciar with a viable night capability.

Provide the superior numbers of Soviet/Warsaw Pact ground forces with an operating sanctuary by default.

Underutilize available aircraft and require more sorties during higher-threat day/night conditions.

We will be doing that at night. Night is the payoff for us, a very high payoff, most important capability as far as attack is concerned is being able to achieve that night capability.

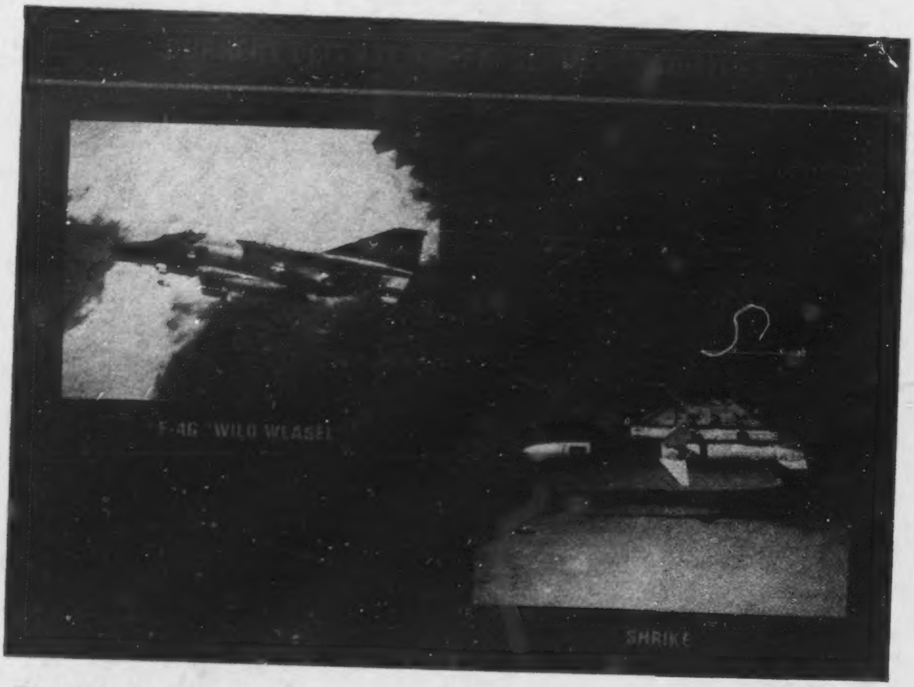
Here is why. We not only take advantage of our technological advantage, but there is another interesting fallout by achieving night capability and that is shown in this next slide.

[Chart deleted.]

Something that doesn't get talked about very often, the red triangles being SA-6 and green SA-8. [Deleted.]

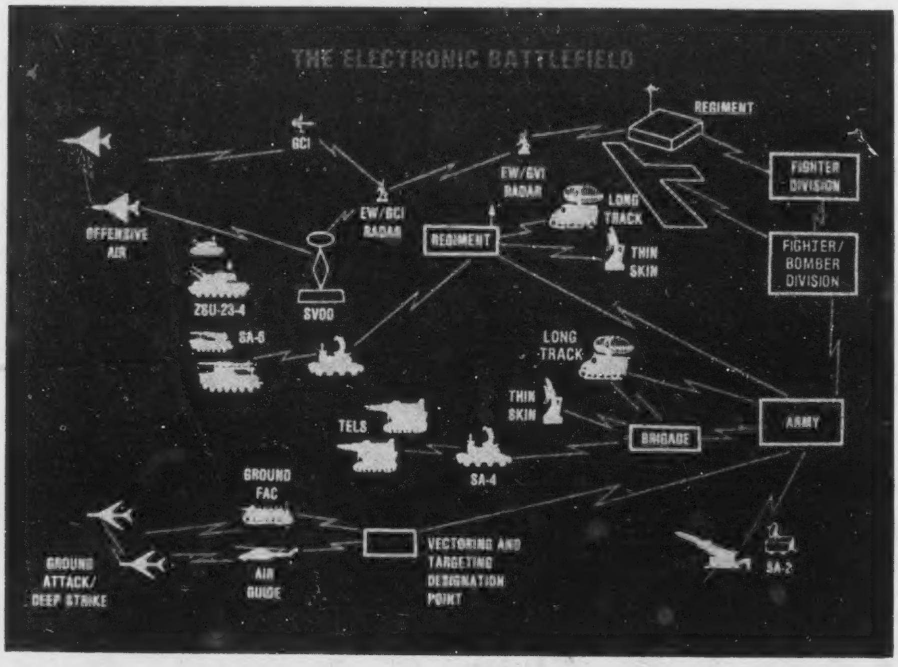
Most importantly, by virtue of going low level at night you eliminate this air-to-air defensive fighter force with the exception of the [deleted] look down-shoot down capability. You take most of his radar SAMS down, particularly their optical launch capability and you eliminate all of this IR and EO sensors.

By virtue of being able to navigate low level at night and attack a target, we eliminate a sizable portion of that extensive threat.

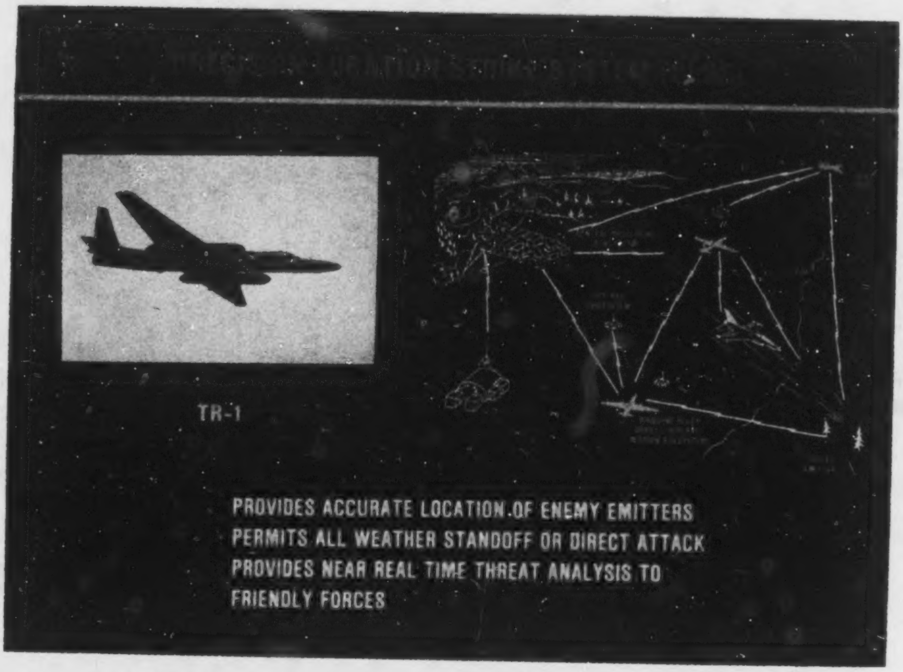


Finally, electronic combat, a major portion of our budget. These are the two major defense suppressant systems in our current force, Wild Weasel which has been around in Vietnam and used effectively there and the Shrike which is still left over from Vietnam, an excellent weapon, but very limited in capability.

A major program in our 1984 request is HARM, an upgraded SAM weapon.


THE ELECTRONIC BATTLEFIELD
GCI
REGIMENT
EW/GVI RADAR
FIGHTER DIVISION
EW/GCI RADAR
LONG TRACK
OFFENSIVE AIR
REGIMENT
THIN SKIN
FIGHTER/ BOMBER DIVISION
ZSU-23-4
SVOD
SA-6
LONG TRACK
THIN SKIN
TELS
BRIGADE
ARMY
SA-4
GROUND FAC
GROUND ATTACK/ DEEP STRIKE
AIR GUIDE
VECTORING AND TARGETING DESIGNATION POINT
SA-2

That SAM threat is a highly integrated threat. It requires communications, detailed communications, both between the air defense forces and the SAM forces on the ground. Because of the Soviet doctrine of centralized control, it is vulnerable to attack. In that regard our compass call program which is designed to jam the [deleted] and the EF-111 which will jam EW/ACQ/GCI radars which cue the air defense forces are an essential part of our overall defense suppression forces.

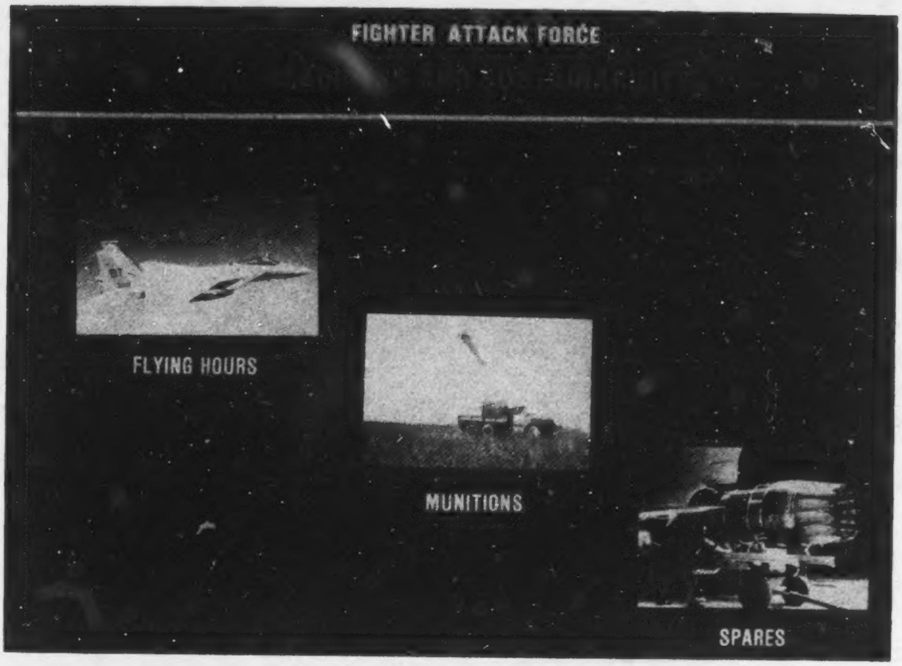


[illegible]

TR-1

PROVIDES ACCURATE LOCATION OF ENEMY EMITTERS
PERMITS ALL WEATHER STANDOFF OR DIRECT ATTACK
PROVIDES NEAR REAL TIME THREAT ANALYSIS TO FRIENDLY FORCES

Second to finding the second echelon, a main program is a PLSS system which will find the SAM systems to do what the E-3A does for the air defense threat. The PLSS system has excellent capacity to locate emitters of the various SAM elements in that system, specifically identify them and locate them so that we can plan our routes around them or directly attack them, it is an essential part of being able to take down the Soviet SAM system.



Finally, the last portion, readiness and sustainability, our highest objective in the defense budget. I will touch briefly on these areas; flying hours, as you well know, are critical to the training of our crews.

In the 1984 budget we have requests that bring us up to almost 20 hours for an aircrew and by 1985 we hope to achieve a 21-hour per crew objective.

Senator GOLDWATER. That is per pilot?

General GORTON. That is correct. Per crew in the case of two-man aircraft. The F-111 would be a lower number of hours to an F-16 which is over 22 hours.

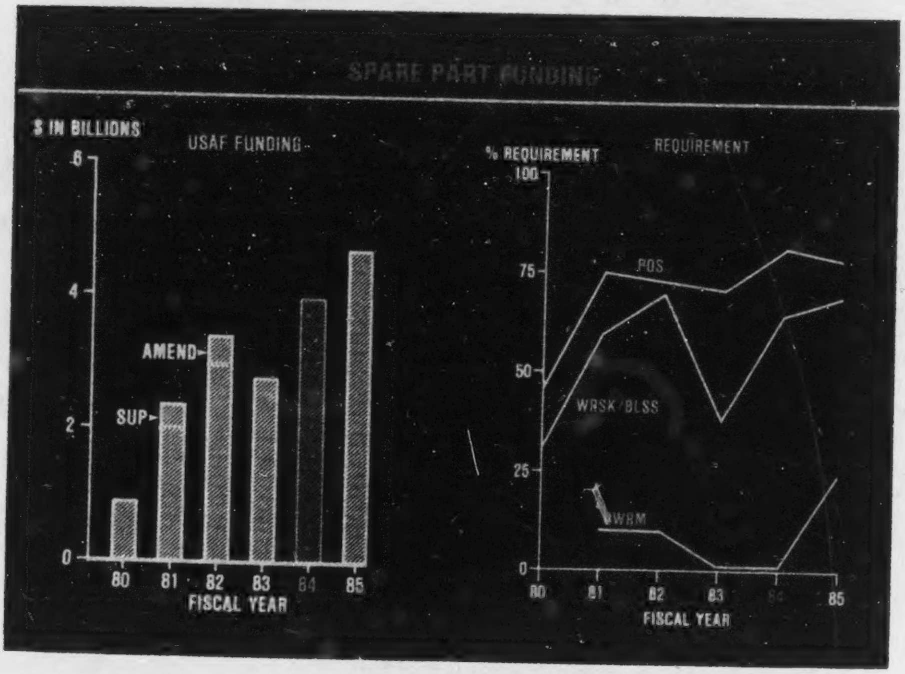
Munitions, I am happy to report, since we made our submission in 1983 the Air Force has undertaken a detailed review of the munitions acquisition plan. We have come up with a plan where we either fish or cut bait.

Here is what is involved in that plan.

THE MUNITIONS ACQUISITION PLAN

Major review of Air Force weapons recently completed.
Objective: A time-phased weapons development and procurement plan.
Result: The munitions acquisition plan:
Represents our best military judgement.
Considers near-term warfighting capability as well as future requirements.
Provides an affordable balance.
Direct attack, terminal standoff, long range standoff.

General GORTON. We believe the Air Force's munitions acquisition plan provides an affordable course for us to pursue throughout fiscal year 1983 and provides a balance between our direct attack systems, the iron bombs, and terminal stand-off as well as long-range stand-off such as MRASM which we are fully supporting and funding in 1984 for development and a new system, the SAW, Stand-off Attack Weapon, which will provide us with a short/range terminal stand-off.



General Gorton. Finally, sir, as far as spares go, there has been detailed testimony on the Hill by Secretary Orr and General Gabriel with regard to our 1984 request and what happened between 1983 and 1984.

We found that we did not fully fund in 1983 to the level that we said we were able to and we found that to be a problem with our ability to account for the demands on the supply system. 1984 regretfully will not bring us to full supply funding. I will show you where we are.

The three categories of supply are peacetime operating stocks, war reserves which are designed to last for about 30 days to support the fighting forces when we deploy, and then other war reserve material which is designed to fill the gap between the combat stocks and when production starts up and begins to supply our forces.

In 1983 we were hoping to fund POST to 100 percent, but we were unable to do that. It was our fault. We understand what went wrong and we are fixing it. We won't be able to fund POST to 100 percent in 1984, only 82 percent.

As far as WRSK/BLSS in 1984, 55 percent. In order to get those we had to make an adjustment in OWRM. Although the budget requests a downturn in peacetime operating stocks in 1985, that is under review in the Air Staff. We hope to increase that funding. We understand our spares problem a heck of a lot better now. We are not trying to duck the issue. We made some mistakes. We understand it now. We are going to fix it.

Senator **Goldwater**. How does this affect your readiness rate?

General **Skantze**. Actually we are starting to benefit from the spares supplies we started in 1981, moneys that were appropriated. If you look across the A-10's, the F-16's, F-4's, and F-15's, our readiness rates are all up in 1982 over 1981. The mean time between failure is up. Maintenance man-hours per flying hour are down. For example, the F-15's added in 1982 were [deleted] mission capable. The maintenance man-hours per flying hour for those airplanes was down to about 20.

On the F-16 it was down about 13 maintenance man-hours per flying hours. So, some of the early spares buys are coming in. The maturing of the maintenance force—you know we have had great retainability and part of that has been the payoff in keeping experienced people longer.

FIGHTER ATTACK FORCE.—SUMMARY PLAN

Today: Improve readiness and sustainability of current force.

Near term (by 1988): Improve capability of current forces by developing and fielding a night/under the weather attack capability.

Flesh out 40 TFW's by continued procurement of F-15's and F-16's.

Initiate procurement of a dual role fighter (F-15E or F-16E) to replace aging F-4's.

Long term (post 1988):

Maintain two fighter production lines.

Develop and procure an advanced tactical fighter to meet the 1990's threat.

So, that picture is looking much better.

Senator **Goldwater**. Actually, this is not directly related, but what effect do you think this proposed pay plan for the man in uniform is going to have on your maintenance forces?

General **Skantze**. We would hope that basically the Air Force would understand the problem. The fact that there is no pay raise in 1984 is mitigated somewhat by the fact that we have experienced a sharp decline in inflation and I think that will help.

In the long run it remains to be seen, but certainly the Secretary and the Chief have tried to get the word out very clearly that Secretary Weinberger has committed himself to a makeup in the 1985 budget.

Senator **Goldwater**. We would be better off if we didn't put that freeze in?

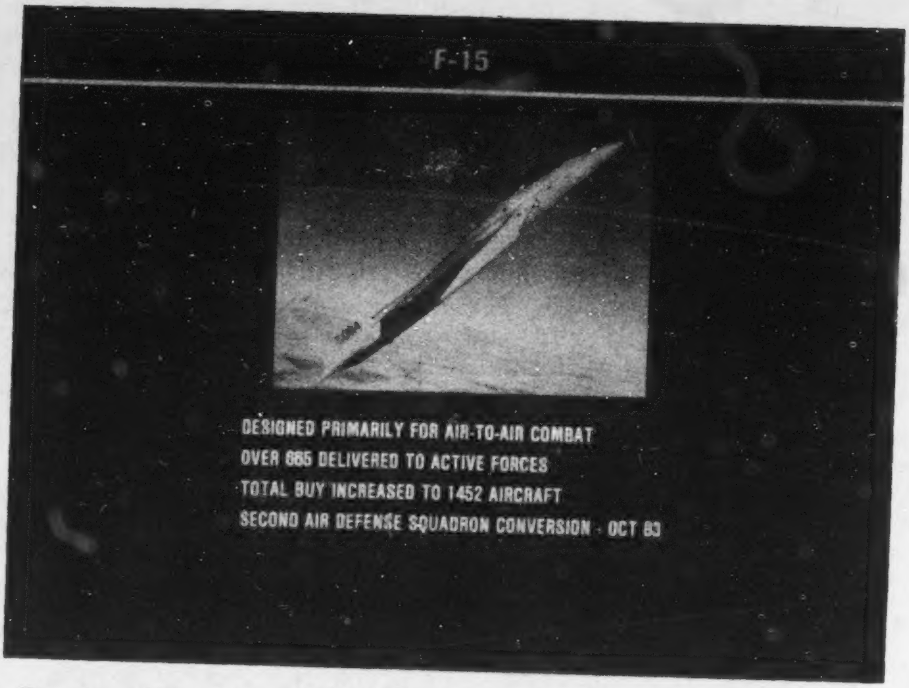
General **Skantze**. In my personal opinion, yes, we would be better off.

General **Gorton**. We will then start with the detailed program review, Mr. Chairman.

TACTICAL AIR FORCES.—RDT&E AND PROCUREMENT PROGRAMS

Fighter attack aircraft; anti-aircraft missiles; air-to-surface weapons; defense suppression/electronic warfare; and other tactical forces.

We will look first at our fighter attack aircraft. The first aircraft will be the F-15.



F-15

DESIGNED PRIMARILY FOR AIR-TO-AIR COMBAT

OVER 865 DELIVERED TO ACTIVE FORCES

TOTAL BUY INCREASED TO 1452 AIRCRAFT

SECOND AIR DEFENSE SQUADRON CONVERSION - OCT 83

Senator GOLDWATER. How many aircraft have you changed to accommodate the role of balance of forces as well as air superiority?

General SKANTZE. None thus far, Mr. Chairman. The objective as you saw of that 40-wing fighter force was to get to 7½ wings of F-15's for the dedicated air-to-air mission.

We have not done anything thus far in terms of configuration of the fighter F-15's for air to ground. In that force structure we show there, if we decided to pick the F-15E version and bought those 400, they would be the dual fighter with about 70 percent air-to-ground mission, long-range interdiction.

Senator GOLDWATER. Are you putting new fuselage skin tanks on all the new models?

General SKANTZE. We are not buying them for all.

General GORTON. I don't have the specifics on it, but we are not buying the conformal fuel tanks, Mr. Chairman, for all of the models of aircraft. Principally C's and D's and I don't believe all of those.

General MARSHALL. I don't have an exact number, but we can supply that.

General SKANTZE. We can supply that for the record.

[The information follows:]

NEW FUSELAGE SKIN TANKS

The conformal fuel tanks (CFT) are required to provide a long range, minimally tanker-supported deployment capability for the Tactical Air Forces' F-15C/D aircraft. The F-15C/D aircraft, produced since fiscal year 1978, have the capability to be fitted with the CFTs, i.e., attach points, fuel fittings/valves, and control wiring. CFTs were initially procured in fiscal year 1982.

The USAF has current plans for 325 shipsets of CFTs. These CFTs provide designated TAC, USAFE and PACAF units a capability for worldwide deployment as may be necessary in response to crises. The AIM-7 missiles normally mounted on the fuselage, mount on the CFTs, maintaining the air-to-air capability of the aircraft during long range deployment.

Final quantities procured will be based on operational mission requirements and fiscal constraints.

Senator GOLDWATER. Have the pilots noticed any change in the performance of those aircraft with those tanks?

General GORTON. I think there were some initial reports that the Israelis who have conformal fuel tanks indicated some degradation of the aircraft performance, but it was not sufficient to cause them any great concern.

I can get some specifics for the record on that, but we have not flown very many with conformal fuel tanks. I am not sure that we have the air crew's opinion on it yet.

Senator GOLDWATER. If you have the figures, all right. If the Israelis like it, that is all right. They are pretty good pilots.

General SKANTZE. In fact, I think we are running a test program at Edwards Air Force Base using tanks that they purchased earlier.

Senator GOLDWATER. Is it the same idea?

General SKANTZE. Exactly.

Senator GOLDWATER. How many gallons or pounds extra does that give you?

General GORTON. In the neighborhood of about 10,000 pounds. It extends the range of the aircraft significantly.

Senator BINGAMAN. Could I ask how the total buy increased to 1,452 aircraft? How many are you buying per year and for what period to get to the 1,452?

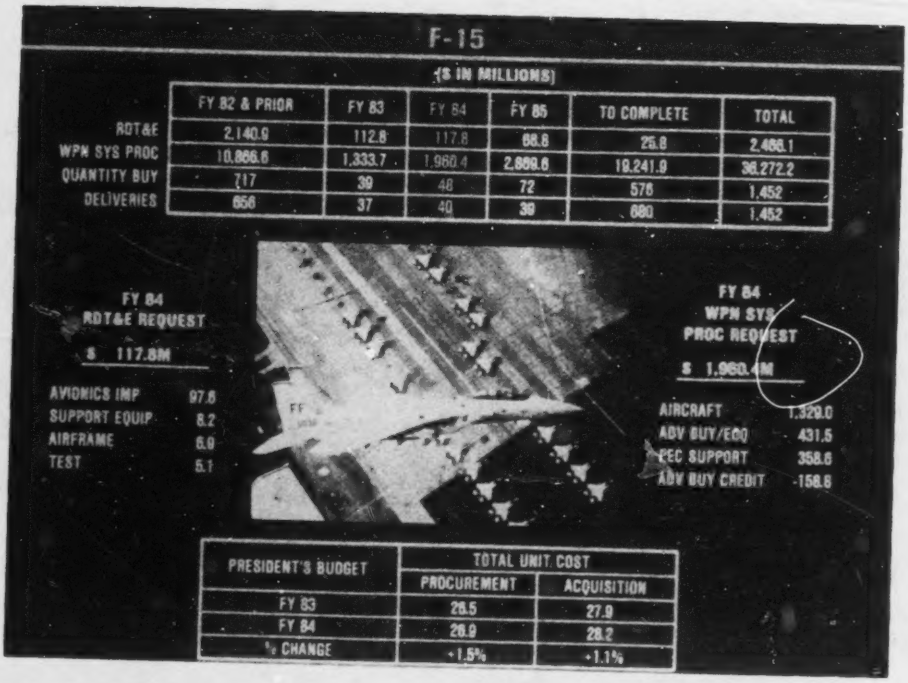
General GORTON. We have 48 in this year's request, 72 aircraft are requested in the 1985 buy in the President's budget, increasing to 96 per year through the FYDP.

Senator BINGAMAN. You will arrive at the 1,452 aircraft by when?

General GORTON. The 1,452 are part of the SAR projection. That would be in the nineties. I would have to take that specifically. It is 91.

General SKANTZE. Now, Senator, if we selected the F-15 as a dual role fighter and that was approved, those 400 would come out of that number.

Senator BINGAMAN. If we picked that, if we picked the F-16, it would come out of that total and I think we would then relook at the balance of how many of the other we intend to buy. Those 400 dual roles are not additive to either force structure.



F-15

($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
RDT&E	2,140.9	112.8	117.8	88.8	25.8	2,486.1
WPN SYS PROC	10,866.6	1,333.7	1,960.4	2,869.6	19,241.9	36,272.2
QUANTITY BUY	717	39	48	72	576	1,452
DELIVERIES	656	37	40	39	680	1,452

FY 84
RDT&E REQUEST
$ 117.8M

AVIONICS IMP	97.6
SUPPORT EQUIP	8.2
AIRFRAME	6.9
TEST	5.1

FY 84
WPN SYS
PROC REQUEST
$ 1,960.4M

AIRCRAFT	1,329.0
ADV BUY/EOQ	431.5
EEC SUPPORT	358.6
ADV BUY CREDIT	-158.6

PRESIDENT'S BUDGET	TOTAL UNIT COST	
	PROCUREMENT	ACQUISITION
FY 83	26.5	27.9
FY 84	26.9	28.2
% CHANGE	+1.5%	+1.1%

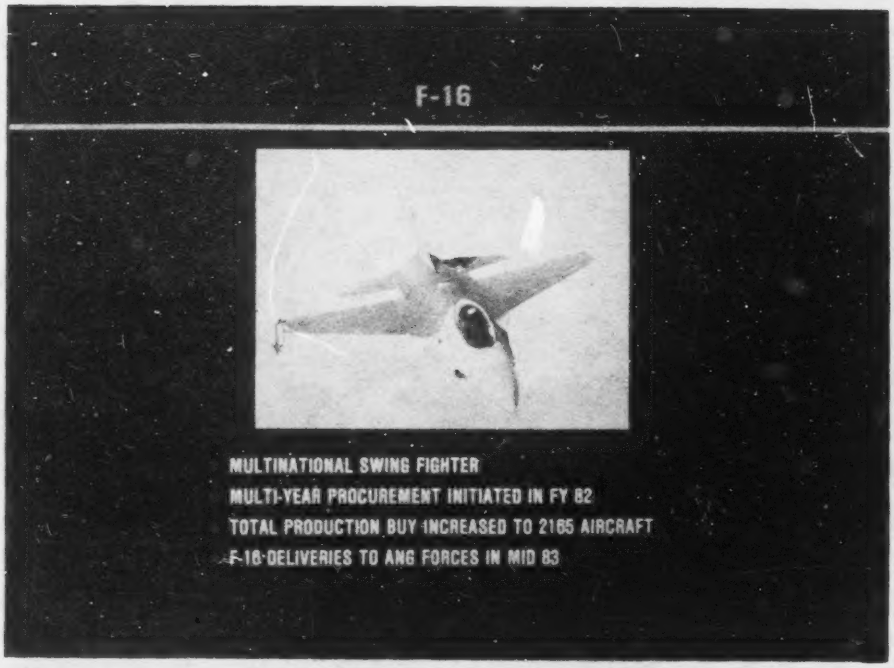
General GORTON. Here is the cost chart on the F-15. Our request for RDT&E this year as well as procurement money.

Senator GOLDWATER. I am trying to find the delivered price. What are you paying per aircraft?

General GORTON. Down at the bottom of the chart, sir.

Senator GOLDWATER. 28.2?

General GORTON. That is the total program acquisition cost. That includes military construction, spares, ground support equipment, R&D, all of the total program costs are included in that column, Mr. Chairman.



F-16

MULTINATIONAL SWING FIGHTER

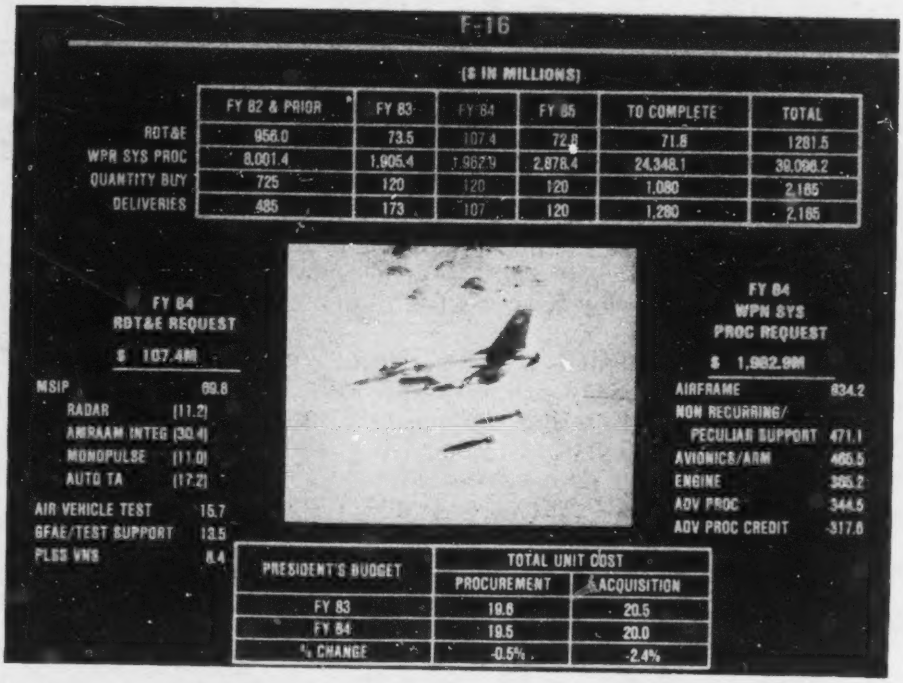
MULTI-YEAR PROCUREMENT INITIATED IN FY 82

TOTAL PRODUCTION BUY INCREASED TO 2165 AIRCRAFT

F-16 DELIVERIES TO ANG FORCES IN MID 83

The next aircraft is the F–16, our principal Swing fighter. The SAR projection for the 1990 timeframe would be 2,165 of these aircraft.

The first Reserve Force unit of F–16's would be equipped during that timeframe. That will be the McIntire Guard unit. We are moving the aircraft in the Reserve Forces to help modernize their forces as well.



F-16

($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
RDT&E	956.0	73.5	107.4	72.8	71.8	1281.5
WPN SYS PROC	8,001.4	1,905.4	1,962.9	2,878.4	24,348.1	39,096.2
QUANTITY BUY	725	120	120	120	1,080	2,165
DELIVERIES	485	173	107	120	1,280	2,165

FY 84
RDT&E REQUEST
$ 107.4M

MSIP		69.8
RADAR	(11.2)	
AMRAAM INTEG	(30.4)	
MONOPULSE	(11.0)	
AUTO TA	(17.2)	
AIR VEHICLE TEST		15.7
GFAE/TEST SUPPORT		13.5
PLSS VNS		8.4

FY 84
WPN SYS
PROC REQUEST
$ 1,962.9M

AIRFRAME	834.2
NON RECURRING/ PECULIAR SUPPORT	471.1
AVIONICS/ARM	465.5
ENGINE	305.2
ADV PROC	344.5
ADV PROC CREDIT	-317.6

PRESIDENT'S BUDGET	TOTAL UNIT COST	
	PROCUREMENT	ACQUISITION
FY 83	19.6	20.5
FY 84	19.5	20.0
% CHANGE	-0.5%	-2.4%

Here is the cost profile on it, sir. There is a request for 120 aircraft in the 1984 budget.

Senator GOLDWATER. General Skantze, this committee has repeatedly insisted that there be an increase in the production rates of our modern fighters. We have placed particular emphasis on increasing the production of the F-16.

What are the Air Force's plans for increasing the F-16 production rate?

General SKANTZE. As you are aware, Mr. Chairman, we currently are on a multiyear procurement contract which runs 4 years, I believe 1982 through 1985. We are currently looking in the 1985 POM process to increase that rate. That proposal is before the Air Council right now.

We are looking at that in 1985. In the 1984 budget, the first increase in that production rate I think is in the 1986 column, but we are currently looking at 1985 to increase that.

Senator GOLDWATER. What will it increase to?

General SKANTZE. We have been looking at anywhere from going to 180 a year to perhaps as many as 220 a year.

Senator BINGAMAN. Mr. Chairman, on the cost here I am somewhat confused. I have seen some statistics indicating that the F-15 cost in excess of twice what the F-16 would cost per unit. That doesn't seem to be reflected on the last two charts that you have shown us.

Also on the F-15 chart you showed a unit price of 28, but we are spending $2 billion to get 48 of them as I understood it.

Where does the rest of the money go? I am not sure I understand.

General **Skantze**. First of all, the ratio is more like 3 to 2 and then you have to look at production rates which affect the unit cost on an annual buy basis.

In addition to that, we have proposed in fiscal year 1984 a multiyear procurement for the F-15 so that there is some additional up front money to start economic ordering of subsystems, parts and vendor supplies to take advantage of getting good price breaks for large orders of items versus restricting that to an annual basis.

Senator **Bingaman**. But on the question of what the unit cost is on the F-15, am I wrong, on the earlier charts you had $2 billion being spent this year for 48 aircraft which comes out to around $40 million per aircraft.

General **Gorton**. That is correct. Those figures are correct, but it does not come out to $40 million per aircraft, Senator.

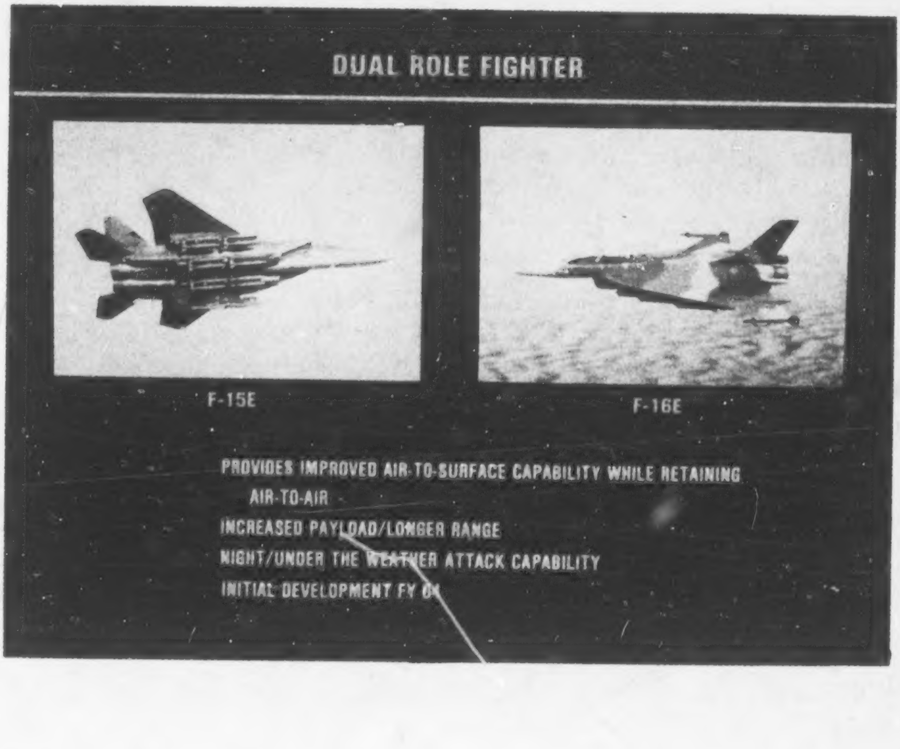
What happens is that that particular funding year has a significant amount of money, well over $200 million, that is based on a multiyear proposal to take advantage of economic order quantities in the front end of that multiyear proposal.

Those figures tend to skew the cost of the F-15 in that particular year.

Senator **Bingaman**. What is the review procedure for the multiyear proposal? You say a proposal.

Does the committee or the Congress pass on that or is that done internally?

General **Skantze**. All four committees of the Congress pass on that. It has to meet certain statutory requirements as far as what quantities of moneys that you can put into multiyear. They are reviewed to a great degree as a proposal for multiyear.



DUAL ROLE FIGHTER

F-15E

F-16E

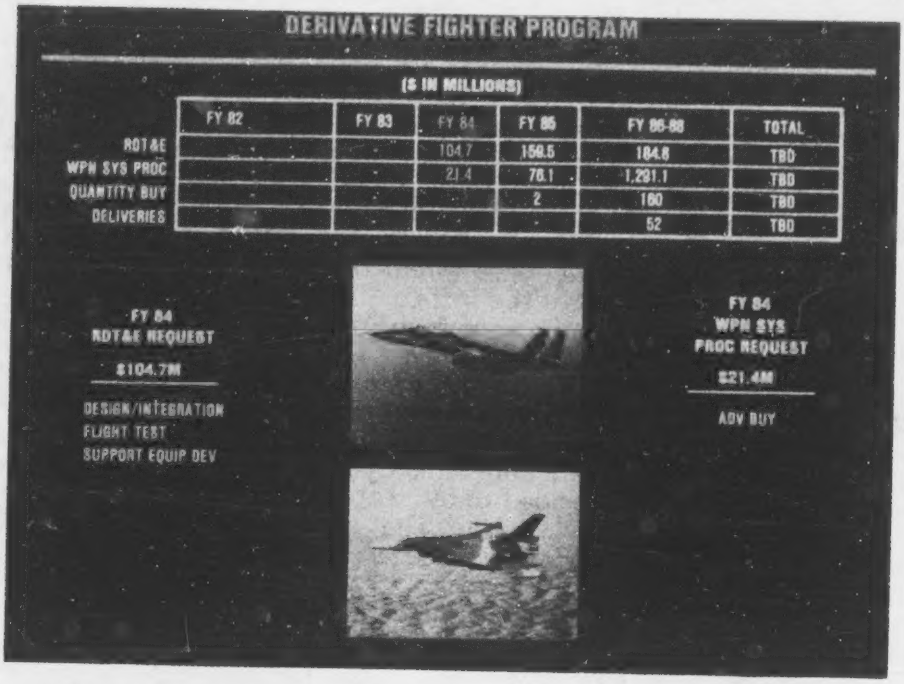
PROVIDES IMPROVED AIR-TO-SURFACE CAPABILITY WHILE RETAINING AIR-TO-AIR

INCREASED PAYLOAD/LONGER RANGE

NIGHT/UNDER THE WEATHER ATTACK CAPABILITY

INITIAL DEVELOPMENT FY 84

General **Gorton**. The next program, Mr. Chairman, is our request for a dual role fighter. As has been discussed, this aircraft would enhance our interdiction capability and augment our F-111 aircraft.



DERIVATIVE FIGHTER PROGRAM

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
RDT&E	-	-	104.7	158.5	184.8	TBD
WPN SYS PROC	-	-	21.4	78.1	1,281.1	TBD
QUANTITY BUY	-	-		2	160	TBD
DELIVERIES		-	-	-	52	TBD

FY 84
RDT&E REQUEST
$104.7M

DESIGN/INTEGRATION
FLIGHT TEST
SUPPORT EQUIP DEV

FY 84
WPN SYS
PROC REQUEST
$21.4M

ADV BUY

The funding profile that is shown in the 1984 budget is reflected here, sir, basically for RDT&E. We are currently doing a comparative demonstration between the F-15 and F-16XL out at Edwards Air Force Base.

The weapons systems procurement line in fiscal year 1984, the $21.4 million is anticipatory. It is based on advanced buy for two aircraft, but not specific as to which aircraft. That remains to be seen depending on the comparative demonstration that is currently ongoing.

We expect by July to have our initial report back on how the details of that demonstration are going. We would not expect to have detailed cost analysis in July. We expect to have that by November of this calendar year. Hopefully, at that time we will make a decision as to which is the preferred candidate for the dual role fighter.

Senator **Bingaman**. Costwise I guess it is clear that the F-16 would be the preferred fighter, is that right?

General **Gorton**. The F-16XL is a significant airframe modification in order to put it in the dual role category. The cranked arrow wing is fairly different than the standard F-16.

Also, a 51-inch plug is incorporated in the fuselage to give it capacity for second seat and more fuel. It is a rather major airframe change whereas the F-15 is a minor airframe change.

So, the up front cost on those two aircraft would be substantially higher for the F-16. Over a life cycle the F-16 would be less costly to operate than the F-15.

As I said, we don't have the detailed cost data yet. We hope to have that by November and we will make a judgment not only on capability, but cost as well.

General **Skantze**. It is fair to say this is a similar comparison and certainly from the economic point of view it is because we are producing F-16's at a higher rate and will continue to do so.

We recognize that in that comparison the production rates and the proposals associated with those are going to be significantly different. That has to be cranked into the evaluation process.

So, whereas I agree from an economics, a number of people would say the obvious choice is going to be an F-16, from an overall comparison point of view, we would rather wait and make that determination in view of all the facts.

It clearly is a dissimilar comparison as opposed to head-to-head, equal point competition. We will have the cost data proposals in, I think, by July and then the comparisons and the total fits performancewise as well as economics will be presented to the Air Council and the Chief probably in the October timeframe for his decision.

Senator **Bingaman**. As I understood your earlier comments, you were saying that if we decided to build the F-15, take the F-15 and turn it into this derivative fighter, that the number of F-15's that we would buy, the old model, would decrease by 400?

General **Skantze**. That is correct.

Senator **Bingaman**. And the same thing would happen on the F-16 side?

General **Skantze**. That is correct.

Senator **Bingaman**. Why is that? That doesn't make sense to me.

General **Skantze**. I think when we put together the force structure it was for both those aircraft and in extending the numbers that we were going to buy we clearly had the intent that the 400 dual role fighters would come out of that force structure on either side as opposed to adding to.

Senator **Bingaman**. It just seems to me perhaps if you decide to buy 400 of the derivative fighters, you might want to reassess how many F-15's and F-16's you would want, after the fact instead of just going ahead. If you buy a derivative fighter which is a modification of the F-16, I don't know why that should be subtracted from the F-16 total rather than subtracted partly from the F-15 total. I don't understand.

General **Skantze**. I am sure it is likely that we will revisit the whole force structure with relation to how that plays with the 40-wing force and ultimate objective of 44.

The final force structure we come out with has to take that into account and will probably be revisited.

Bob, do you want to make any comment?

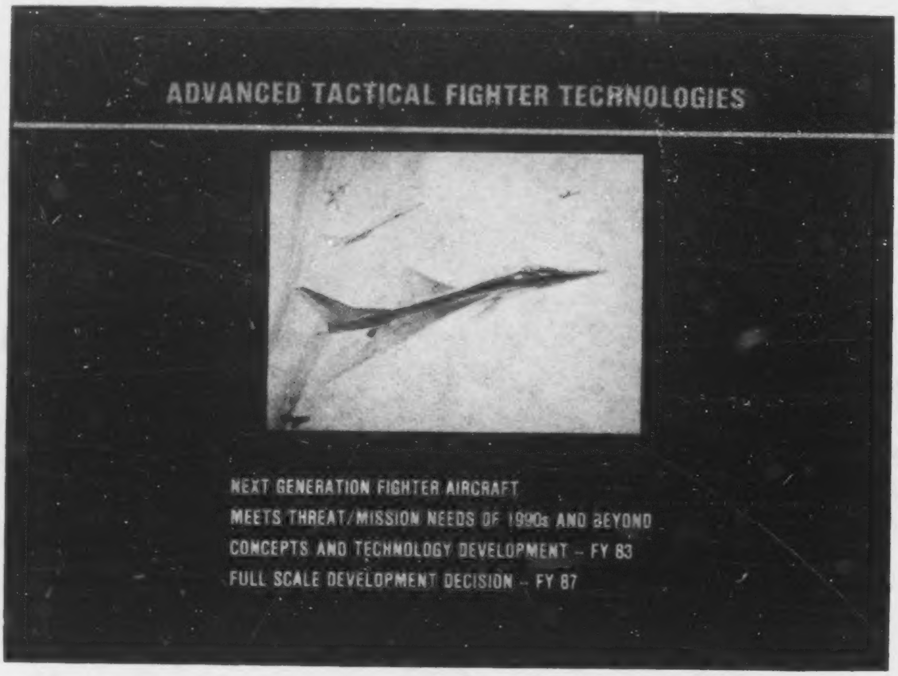
General **Baker**. No, sir, what you say is correct. As we get closer into it, we will want to look at the function and be sure we keep a balanced force.

Senator **Bingaman**. Thank you, Mr. Chairman.

Senator **Goldwater**. Before you carry on, what are the up front costs for the F-15 and the F-16?

General **Skantze**. I think the R&D for the F–15 to bring it to the E configuration is about $270 million and for the F–16E it is about $470 million, $275 million for the 15 and $449 million for the 16.

Senator **Goldwater**. Thank you.



ADVANCED TACTICAL FIGHTER TECHNOLOGIES

- NEXT GENERATION FIGHTER AIRCRAFT
- MEETS THREAT/MISSION NEEDS OF 1990s AND BEYOND
- CONCEPTS AND TECHNOLOGY DEVELOPMENT – FY 83
- FULL SCALE DEVELOPMENT DECISION – FY 87

General **Gorton**. The next program, Mr. Chairman, the 1984 budget is a modest increase in our previous funding for looking at advanced fighter technology. This is a program that explores technology that would be useful in the development of advanced tactical fighter for the midnineties to keep up with the increasing Soviet threat we anticipate at that time.

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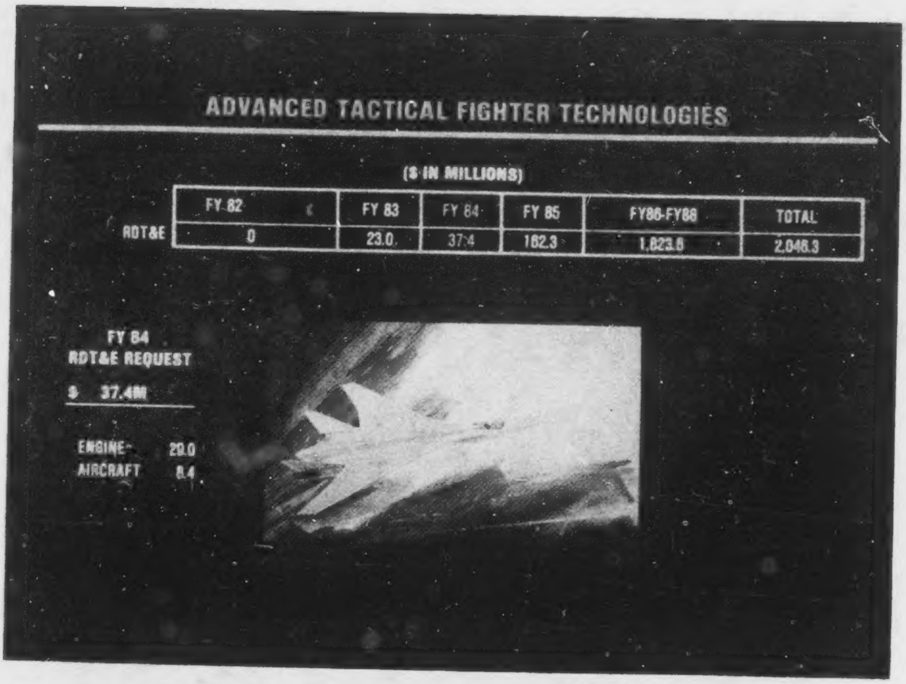


ADVANCED TACTICAL FIGHTER TECHNOLOGIES

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E	0	23.0	37.4	162.3	1,823.6	2,046.3

FY 84
RDT&E REQUEST

$ 37.4M

ENGINE-	29.0
AIRCRAFT	8.4

The increased cost profile shown here from $23 million to $37 million this year. Basically over $29 million of that $37 million goes to look at the engine technology. We find that engines represent a long pole in the development program and we are applying most of our money to looking to technologies for an advanced fighter engine.

Senator GOLDWATER. What thrust engine are you thinking about?

General GORTON. Looking in the 30,000-pound class, but that remains to be seen as to what is technically feasible and thrust-to-weight ratio and force factors as well as materials one uses. We have not focused in on any given category.

Senator GOLDWATER. Do you see an engine with more thrust coming down the road for fighter aircraft?

General GORTON. Yes, sir, I certainly hope so as far as the advanced tactical fighter aircraft is concerned.

Senator GOLDWATER. Are you looking at as high as 40?

General GORTON. In the exploratory stage that we are at now, Mr. Chairman, I don't think we are excluding anything. We are looking at all ranges of thrust that might be possible.

General SKANTZE. Mr. Chairman, this program is properly identified as an ATF technology program. As you are aware, we have been looking at this since 1977, but as we have improved on the capabilities of the F-15 and F-16 we have tended to move it a little further downstream.

We will have a scientific advisory board study this summer, and General Gorton will be the general officer representative, to identify the most promising technology and also take into account the initial concepts on the engines.

Now it is clear that we are going to know how to build engines with fewer rotating parts and more efficiency, maybe two stages in the big fan instead of having more than that. But this summer is going to be a very important milestone for us to try to use the best talents to identify the most promising technologies.

Clearly, in my judgment, it would be the summer of 1984 before we are in a position to state a set of requirements which would come closer to answering your question.

Senator GOLDWATER. I know your staff worked on ceramic blades. Do you see that in itself producing a substantial increase in thrust or merely a substantial larger dependability of aircraft running at the thrust we have now?

General GORTON. Initially I would look for it to improve the durability and performance. Again, as you will know, we have come a long way in the last few years in driving that aspect of it. Fighter engine competition has been a major mover.

So, I think we are looking at the technology, particularly in the engine model derivative programs to make those kind of technical improvements, to first improve durability and then we will size the engine as necessary.

Senator GOLDWATER. Does all this mean that we are going to spend $2 billion just to examine advanced technologies?

General GORTON. No. We will not spend a sizable amount of money, in my judgment, until we have a set of requirements which will be the summer of 1984.

Senator GOLDWATER. What will be accomplish with the $2 billion?

General GORTON. That $2 billion, Mr. Chairman, is requested for moving on to full-scale development at a time hopefully in the late eighties. We are looking at possibly going to full-scale development in fiscal year 1987 and to begin to develop an advanced tactical fighter, although the funding profile in the front end showing the advanced fighter technology, that is the stage we are at now and the funding profile we requested there would allow for full-scale development and initial procurement.

General SKANTZE. I think it is proper to characterize that as the current wedge for that program. Until we are prepared to come forward and say we now know that the requirements are and we now know the technologies we want to fold in and this is the program we want to start.

I think it is a little over a year away before we will be prepared to say that.

Senator GOLDWATER. I realize that this has been a highly classified subject and anything I ask in that category, don't answer, but again in the morning paper they are talking about something we have been working on since 1977 now getting ready to go.

Is this wrapped up in that or not?

General SKANTZE. I think this is a generic new look at an advanced technology fighter which would incorporate several technologies and would look at things which are low-radar cross section as well as STOL capability, advanced avionics.

It is a more generic new advanced technology fighter airplane.

Senator GOLDWATER. Are you thinking about a great increase in speed or altitude or are you thinking of adding improvements in aerodynamics that will give you better maneuvering capability at the speed we are talking about?

General SKANTZE. At this stage we are sort of all of the above. That is why we want this SAB group to look at it this summer.

First, of all, it is obvious in the case of the 15 and 16 they are superb platforms for maneuverability. You ask yourself do you want to pull more than nine G's. We also have an F–16 advanced fighter technology integration airplane out at Edwards which has additional control surfaces so that it can do flat turns and move around in odd ways.

All of that contributes to what we need to ask ourselves this summer, what are we really looking for?

Now, you mentioned higher speed. Maybe not, but maybe super cruise and the ability to sustain supersonic and military power is something we would like to be able to do for long-range interception.

We are looking at all of the above this summer. I would think at the end of that summer's study we will have a set of priorities.

Senator GOLDWATER. Where are you going to have your meeting regarding this?

General GORTON. The final session will take place at Monterey, Calif. We had our first meeting just last week at Wright-Patterson Air Force Base.

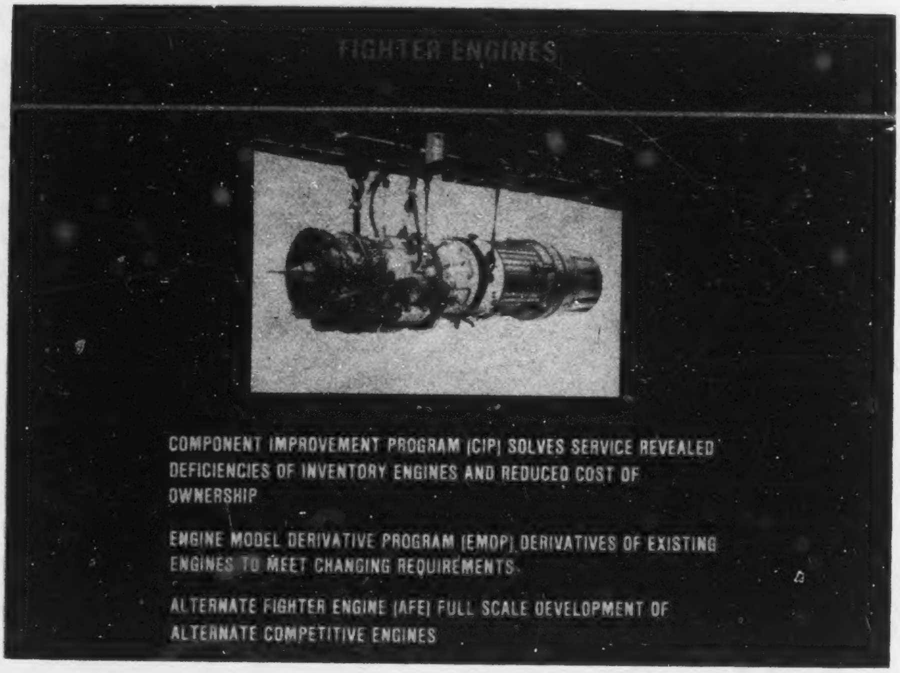
Senator GOLDWATER. That is a nice place to have it. Is it going to be possible for members of our staff to attend that meeting or is it highly classified?

General GORTON. It is highly classified, Mr. Chairman. Obviously in order to look at the full spectrum we have had to bring members of the scientific community in.

General SKANTZE. We can make some arrangements.

Senator GOLDWATER. Don't answer it now, but keep in mind our staff is cleared and has quite a bit of expertise in this field. I would just like to know what we are talking about.

After having been flying most of your life, you can't imagine what you are going to do next. I would just like to know.



FIGHTER ENGINES

COMPONENT IMPROVEMENT PROGRAM (CIP) SOLVES SERVICE REVEALED DEFICIENCIES OF INVENTORY ENGINES AND REDUCED COST OF OWNERSHIP

ENGINE MODEL DERIVATIVE PROGRAM (EMDP) DERIVATIVES OF EXISTING ENGINES TO MEET CHANGING REQUIREMENTS

ALTERNATE FIGHTER ENGINE (AFE) FULL SCALE DEVELOPMENT OF ALTERNATE COMPETITIVE ENGINES

General GORTON. The next program in the President's budget that we will discuss is the fighter engine program.

We are emphasizing competition and increasing the durability and reliability.

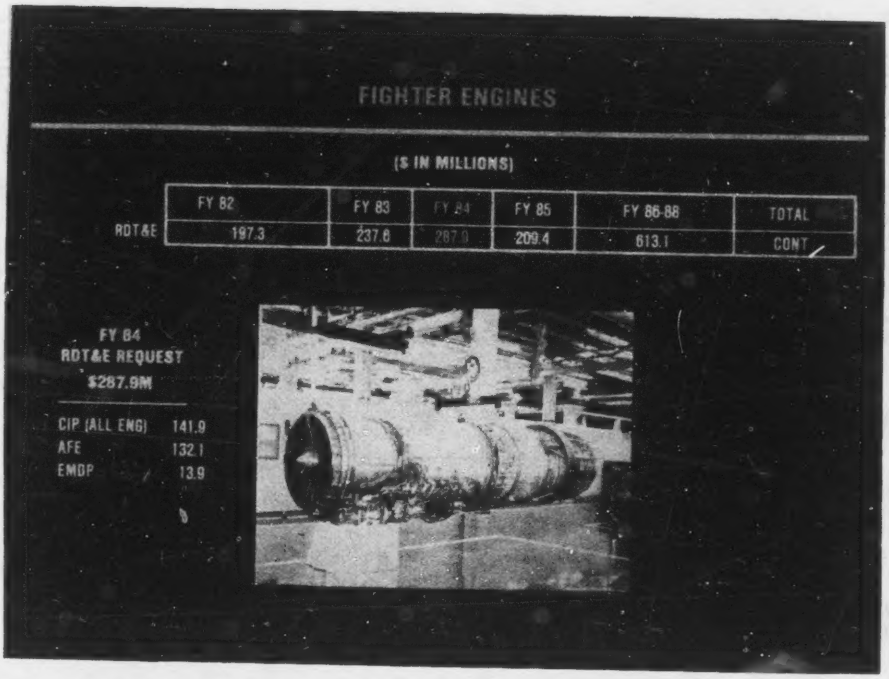
Senator GOLDWATER. I brought this up the other day. I had heard that you were inviting foreign competition?

General GORTON. No, Mr. Chairman.

Senator GOLDWATER. Now, this is going to be a 30,000-pound engine?

General GORTON. No, sir. This is the F-100 and the F-110 derivative.

General SKANTZE. The F-110 is about 27,000 pounds, but it is heavier than the F-100 which is about 23,000 pounds. The thrust is not an issue in the competition.



FIGHTER ENGINES

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
RDT&E	197.3	237.8	287.9	209.4	613.1	CONT

FY 84
RDT&E REQUEST
$287.9M

CIP (ALL ENG)	141.9
AFE	132.1
EMDP	13.9

Senator **Goldwater**. It has been suggested that the outcome of the derivative fighter engine competition has been predetermined. Some of the suggestions are that General Electric's F-110 engine will be selected regardless of the results of the competition.

If that is true, and I don't say it is, how will you insure this competition is conducted fairly?

General **Skantze**. We sent out, Mr. Chairman, a draft request for proposals. Personally I asked both the competitors to look at that and if they had any cause for concern about how the request was structured, because really the proposal will say proposed against an annual buy for one model, an F-16 or F-15, or both, proposed against a multiyear for 3 or for 5 years.

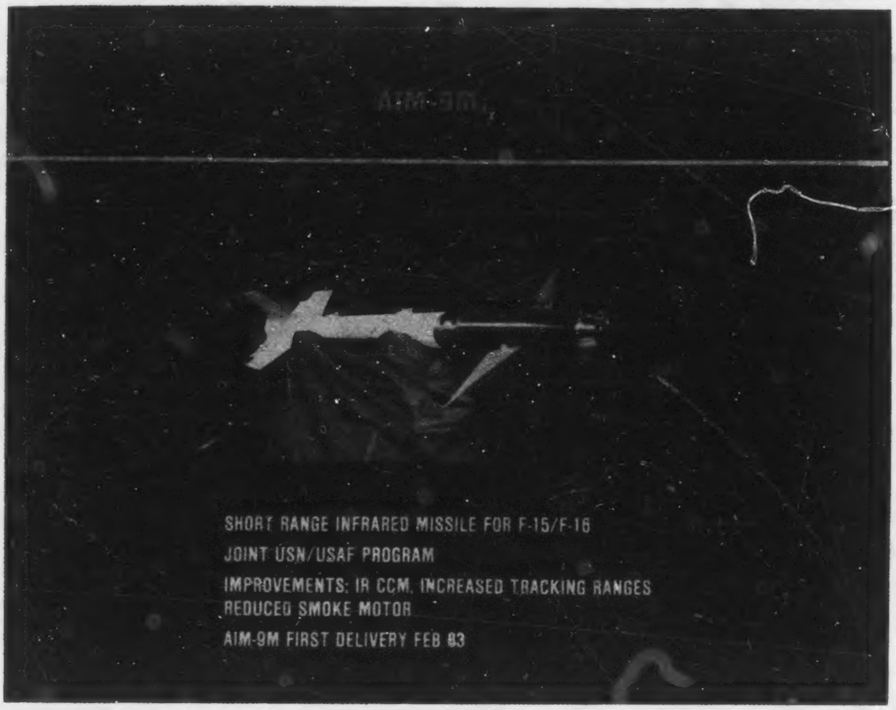
It is based on the fact that one contractor could win it all or one contractor could be awarded part of the buy. So, it is not predetermined by any means. In my judgment, I wouldn't rule out either one of them and I don't think anybody has.

Senator **Goldwater**. All right. I just wondered where we got that rumor.

General **Gorton**. We will now move to a section where we address air-to-air missiles.

TACTICAL AIR FORCES.—RDT&E AND PROCUREMENT PROGRAMS

Fighter attack aircraft; anti-aircraft missiles; air-to-surface weapons; defense suppression/electronic warfare; and other tactical forces.



AIM-9M

SHORT RANGE INFRARED MISSILE FOR F-15/F-16

JOINT USN/USAF PROGRAM

IMPROVEMENTS: IR CCM, INCREASED TRACKING RANGES
REDUCED SMOKE MOTOR

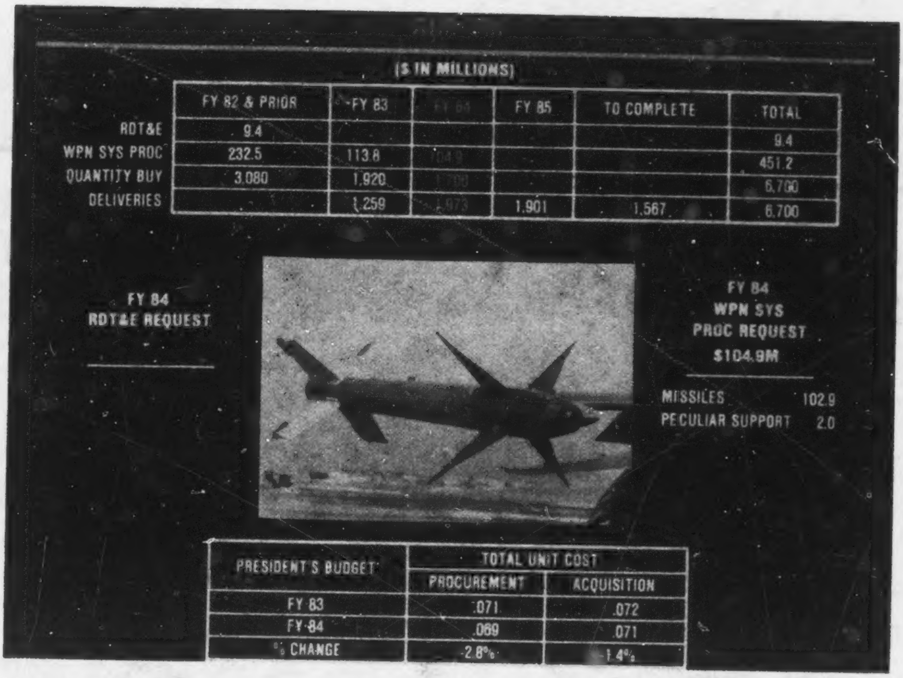
AIM-9M FIRST DELIVERY FEB 83

The first one is the AIM–9M model.

Senator GOLDWATER. When you say short range what are you talking about?

General GORTON. It is shorter than the radar range. We are talking in terms of a maximum of about [deleted] miles under the most ideal conditions and a minimum range which allows us to be able to fire air-to-air missiles very close in against maneuvering targets, it is an IR missile.

We have all aspect capability on the new IR missiles, and provide very high closure rate at fairly long distances. I think [deleted] might be pushing it a little bit. [Deleted] would be about right.



($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
RDT&E	9.4					9.4
WPN SYS PROC	232.5	113.8	104.9			451.2
QUANTITY BUY	3,080	1,920	1,700			6,700
DELIVERIES		1,259	1,973	1,901	1,567	6,700

FY 84
RDT&E REQUEST

FY 84
WPN SYS
PROC REQUEST
$104.9M

MISSILES	102.9
PECULIAR SUPPORT	2.0

PRESIDENT'S BUDGET	TOTAL UNIT COST	
	PROCUREMENT	ACQUISITION
FY 83	.071	.072
FY 84	.069	.071
% CHANGE	-2.8%	-1.4%

This here is our last procurement for the AIM–9M. As you will see, Mr. Chairman, we are dovetailing our antiair missile procurement with the role of AMRAAM that we will start advance procurement on this year.

Senator GOLDWATER. What has been your success rate on this missile in regards to percentage of hits?

General GORTON. As far as the testing goes we had a relatively high percentage of hits on it.

General MARSHALL. I don't have the success rate, but in the Israeli conflict, for example, you frequently found that more than one missile was fired. They frequently fired multiple missiles.

So, if you see a success rate of 0.3, that is about what you would expect, about 0.3 for a multiple missile firing against a target, a successful kill rate.

General SKANTZE. I think the test program where we fired one missile at a time on the AIM–9M was highly successful.

General GORTON. Yes, sir, it was.

Senator GOLDWATER. That is what I wanted to know. You say highly successful. Did you get 80 or 85 percent?

General SKANTZE. I think we got better than that. More like 90 percent.

Senator GOLDWATER. More like 90 percent?

General SKANTZE. Yes.

Senator GOLDWATER. Why are you not procuring any more AIM–9's after 1984?

General SKANTZE. We will have met 96 percent of our inventory objective of 96 percent which we will procure through 1984. This is all we plan to buy for the force structure.

Senator GOLDWATER. What is your follow-on?

General SKANTZE. I think that fills our inventory. I guess the next follow-on development in short range would be the ASRAAM which is currently in early development by the British and the Germans.

Senator BINGAMAN. This is what is referred to as the Sidewinder; is that right?

General SKANTZE. Yes, sir.

Senator BINGAMAN. You are going to replace this with the AMRAAM?

General SKANTZE. No. This will be replaced by an advanced short-range air-to-air missile, ASRAAM, which the British and Germans are defining.

Between the AMRAAM and the ASRAAM we have a joint German-United Kingdom-United States program. We are building the AMRAAM and it will be coproduced in Europe. They are going to develop the ASRAAM and it may be coproduced back here.

So, the follow-on to this is the advanced short-range air-to-air missile which is currently in configuration definition.

Senator BINGAMAN. We don't have any idea what the comparative cost of that new one will be as compared to this?

General SKANTZE. No; because I think we are scheduled to see the configuration that the Germans and British are proposing this summer. Is that right, Jim?

General MARSHALL. We are being briefed on it.

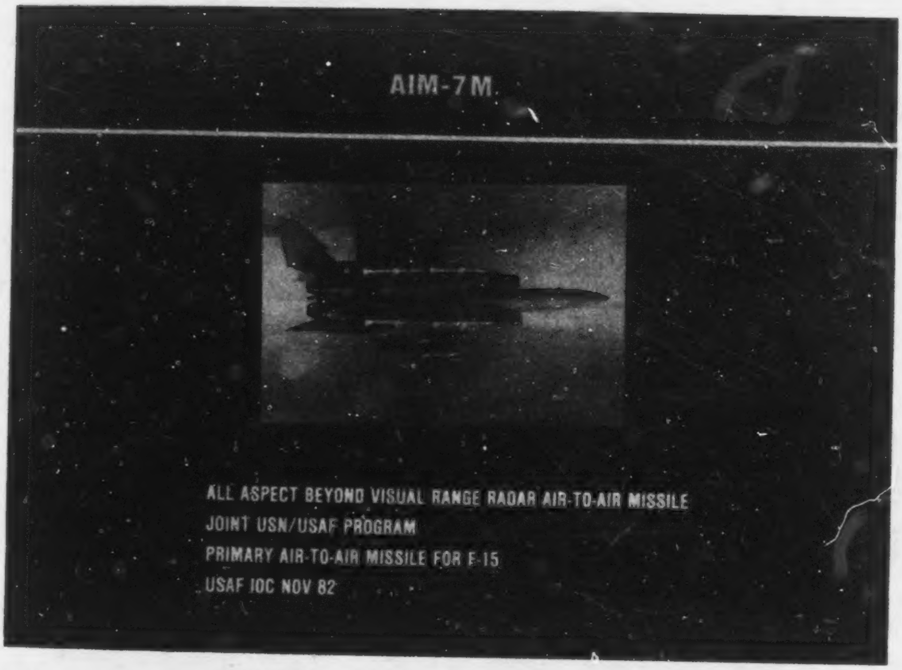
General SKANTZE. They are supposed to come over and show us the configuration.

Senator BINGAMAN. Is this one of the weapons that I keep hearing rave reviews about, about how effective it is? It seems like an unusual one to pick to phase out.

General GORTON. It is not being phased out, Senator. The Navy will continue to keep the production line open. They have a requirement. We are stopping our procurement in the 1984 President's budget because we have achieved our objective of about 96 percent with these types of missiles. But the line is not closing down.

Senator BINGAMAN. But you will be buying another type of missile instead of this, once it is developed?

General SKANTZE. Presumably so would the Navy. But that is a little ways down the road yet.



AIM-7M

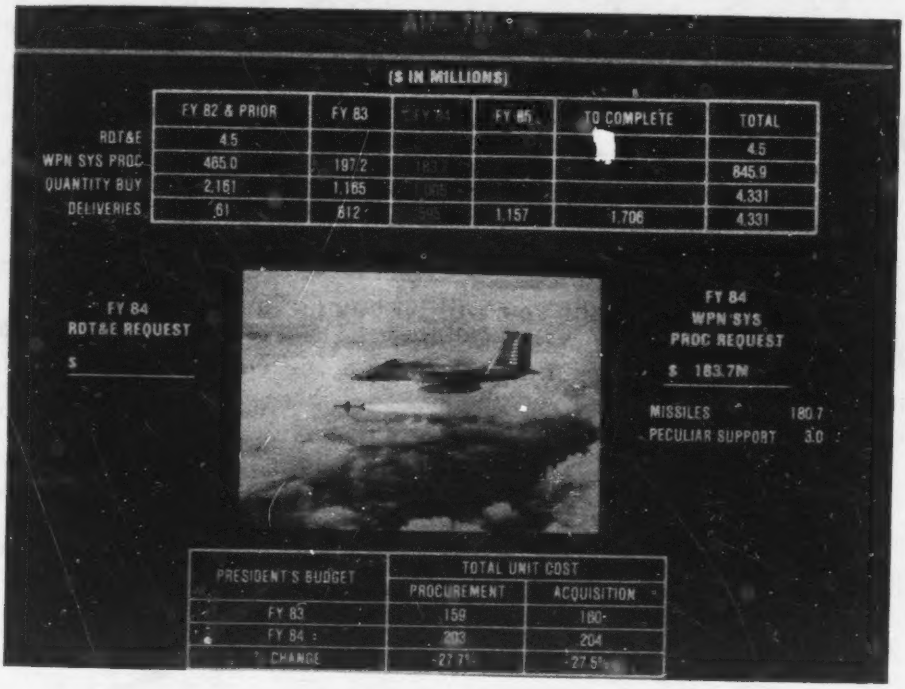
ALL ASPECT BEYOND VISUAL RANGE RADAR AIR-TO-AIR MISSILE

JOINT USN/USAF PROGRAM

PRIMARY AIR-TO-AIR MISSILE FOR F-15

USAF IOC NOV 82

General Gorton. The AIM-7M is our radar medium-range missile. It is also a joint Navy and Air Force program.



AIM-7M

($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
RDT&E	4.5					4.5
WPN SYS PROC	465.0	197.2	183.7			845.9
QUANTITY BUY	2,161	1,165	1,005			4,331
DELIVERIES	61	612	595	1,157	1,706	4,331

FY 84
RDT&E REQUEST
$

FY 84
WPN SYS
PROC REQUEST
$ 183.7M

MISSILES	180.7
PECULIAR SUPPORT	3.0

PRESIDENT'S BUDGET	TOTAL UNIT COST	
	PROCUREMENT	ACQUISITION
FY 83	159	160
FY 84	203	204
CHANGE	-27.7%	-27.5%

We are looking at procuring in the 1984 budget the last of these vehicles as well. This is the missile that will be replaced by the AMRAAM, Senator Bingaman. That production phasedown is coordinated with the beginning of procurement for AMRAAM.

Senator **Goldwater**. Who is making that?

General **Gorton**. The AIM-7, sir?

Senator **Goldwater**. Yes.

General **Gorton**. It is Raytheon on the guidance control on the AIM-7. The fuse is also by Raytheon. General Dynamics is also a producer. The motor is made by Hercules.

Senator **Goldwater**. Thank you.

Senator **Bingaman**. Is that what is referred to as the Sparrow?

General **Gorton**. That is correct.

Senator **Bingaman**. I was reading over the statement that Senator Hart put out a couple weeks ago. He criticized this decision to phase out the Sparrow and put in the AMRAAM, saying that it promises to be worse than the Sparrow since it must depend on its own radar for terminal guidance which is even less capable than the radar in the aircraft which guides the Sparrow.

What would be your reaction to that comment?

General **Skantze**. I think the bad press on the Sparrow, if you will, goes back to Vietnam when we had AIM-7E's and we had fire control system problems and the kill ratio was very low. The AIM-7F and AIM-7M have been tremendous improvements. The Israelis used 7F and had enormous success with it. The current generation of the Sparrows in terms of 7F and 7M are far superior to what we are talking about back in Vietnam which is 16, 17 years ago.

All of what we have done in the validation phase of the AMRAAM when we had two competitors, Hughes and Raytheon before picking Hughes, indicated to us that we are going to have a very good missile.

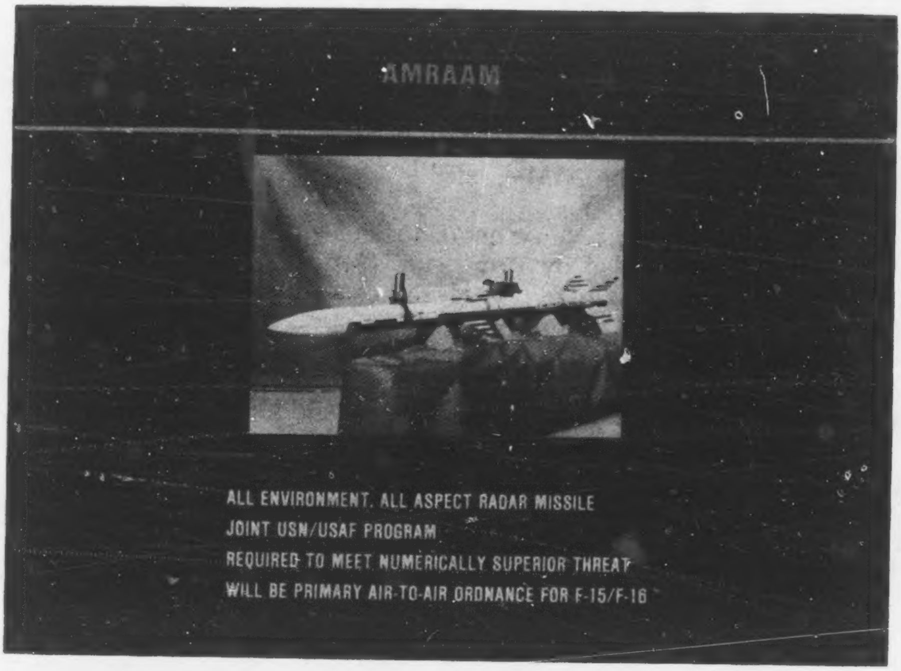
General **Marshall**. The AMRAAM, of course, does have a lot of advantages over the Sparrow.

First of all, you can launch it and leave it. It does have its own independent radar, whereas with the Sparrow the attacking airplane has to stay with the missile until the impact because he is illuminating the target with his radar.

The AMRAAM will have a multiple kill capability. With the Sparrow you can only control one of them at a time whereas you can launch multiple AMRAAM's against a formation and they would guide independently.

Another big advantage of AMRAAM is greatly improved countermeasures capability. It is a very sophisticated computer controlled missile.

Senator **Goldwater**. As a matter of interest, our first jet ace in Vietnam, Steve Ritchie, got all five of his with a Sparrow. That is a pretty good record for a young lieutenant that was not quite dry behind the ears.



AMRAAM

ALL ENVIRONMENT, ALL ASPECT RADAR MISSILE
JOINT USN/USAF PROGRAM
REQUIRED TO MEET NUMERICALLY SUPERIOR THREAT
WILL BE PRIMARY AIR-TO-AIR ORDNANCE FOR F-15/F-16

General GORTON. This is the AMRAAM.

Senator GOLDWATER. Before you move on, how many Sparrows do you have now?

General GORTON. This buy completes [deleted] of our radar missile requirement through 1984.

Senator GOLDWATER. What will that total be?

General GORTON. We have a total of [deleted] required so it would be roughly [deleted] of that. That is [deleted] missiles. That is of the Sparrow variety, Mr. Chairman.

We would proceed on to meet our radar missile requirement with the introduction of the AMRAAM.

Senator GOLDWATER. How many days would that last in a European conflict?

General GORTON. I don't have the specific figures on that.

General SKANTZE. We will give you something.

[The information follows:]

SPARROWS

The Air Force does not measure its inventory of air-to-air weapons by the number of days stockpiled. The number of weapons expended per day will vary greatly depending on the intensity and nature of the battle. A more meaningful measurement is the percent of weapons stockpiled to eliminate the air threat allocated to the Air Force.

If the air threat presented itself in such a way that each F-15 and F-4 (air-to-air mission) could fire its complete AIM-7 load on every sortie, they could fire all the AIM-7's within the [deleted]. It is unlikely that the preceding could occur.

After all the AIM-7's were fired, we would expect to have killed [deleted] of the air threat allocated to the Air Force radar missiles.

Senator GOLDWATER. I don't know if anybody has ever thought about it. We are talking about missiles last year. It turned out we had 4 days' supply of missiles for any European conflict, I think each aircraft having two missions with missiles.

General SKANTZE. A couple years ago we didn't have enough for one mission.

Senator GOLDWATER. I would like to be brought up to date on that. I think it can have a very good effect on the decisions that will be made. I don't mind saying that this type of weapon will be quite a target for those who want to cut.

One more point. How did the Sparrow do in the last conflict in Lebanon?

General GORTON. It did very well. I don't have the specifics on that, but they had a fairly high success rate in the Sparrow launches. The conflict was close in and very well controlled. [Deleted] Sparrow kills.

Senator GOLDWATER. I am glad to hear that. We have been trying to get that out of intelligence for a long time. Even as close to the Israeli Air Force as some of us are, we couldn't get them to tell us, but that is pretty good.

Do you know how many they fired?

General GORTON. We don't have that detail for you.

Senator GOLDWATER. If you could get that, I would like to have the success rate.

General GORTON. We know out of the [deleted] kills that the F-15 made, missile kills, [deleted] were with the Sparrow.

General SKANTZE. General Marshall has seen how many they fired.

Senator BINGAMAN. The figure I have is that they fired [deleted]. Is that reasonably accurate or not?

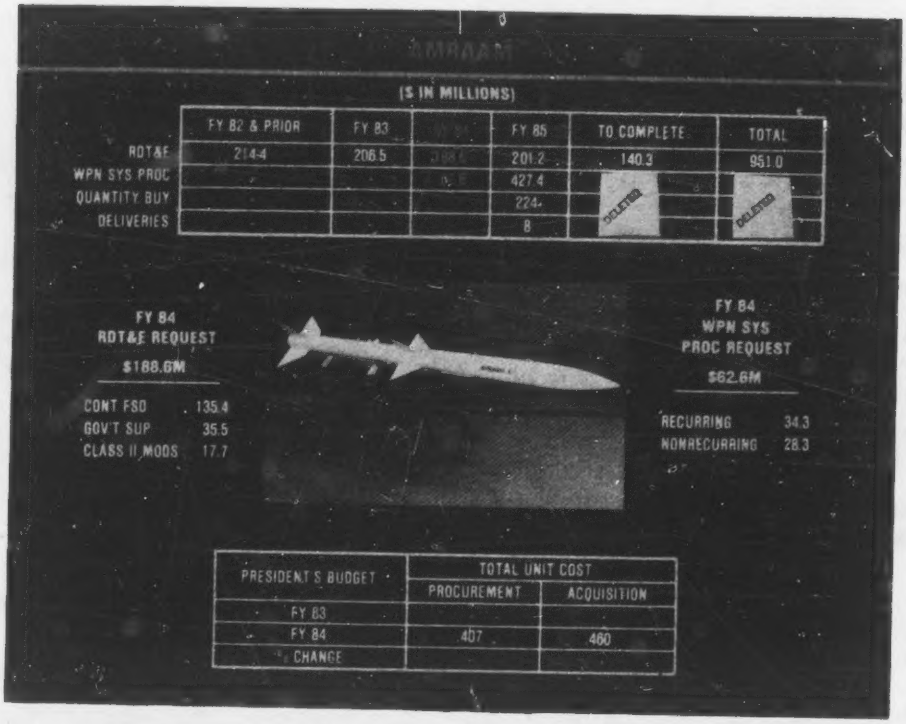
General GORTON. We will have to check that.

Senator GOLDWATER. Let us get that figure for the record.

[The information follows:]

SPARROW MISSILES USED BY ISRAEL

Current intelligence information consists of conflicting reports from multiple sources, but this situation will hopefully be rectified with the visit of the USAF team in April. Preliminary Israeli information indicates the F-15 downed [deleted].



AMRAAM

($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	[illegible]	FY 85	TO COMPLETE	TOTAL
RDT&E	214.4	206.5	[illegible]	201.2	140.3	951.0
WPN SYS PROC			[illegible]	427.4	DELETED	DELETED
QUANTITY BUY				224		
DELIVERIES				8		

FY 84
RDT&E REQUEST
$188.6M

CONT FSD	135.4
GOV'T SUP	35.5
CLASS II MODS	17.7

FY 84
WPN SYS
PROC REQUEST
$62.6M

RECURRING	34.3
NONRECURRING	28.3

PRESIDENT'S BUDGET	TOTAL UNIT COST	
	PROCUREMENT	ACQUISITION
FY 83		
FY 84	407	460
CHANGE		

General Gorton. We have discussed the AMRAAM.

Senator Bingaman. Another thing I got out of this same publication is that the AMRAAM is going to cost about four times what the Sparrow does.

Is that accurate?

General Marshall. No, sir. Our original intent was for it to cost about what the Sparrow cost. The AIM-7M Sparrow right now in 1978 dollars, which is our base year, $125,000. The comparable cost for AMRAAM in the same year dollars, the Air Force's estimate is $122,000.

So, it is a little bit less. Now, we do have some disagreement within our cost circles and an OSD estimate is $169,000. So, it is somewhere still comparable to the AIM-7.

Senator Bingaman. I would appreciate getting the precise figures there because that is a major disparity between what is indicated here.

General Marshall. The Air Force estimate is $122,000. OSD has required us to put some additional money in the outyears because they think that the procurement costs will be as high as $169,000. That we consider an upper bound.

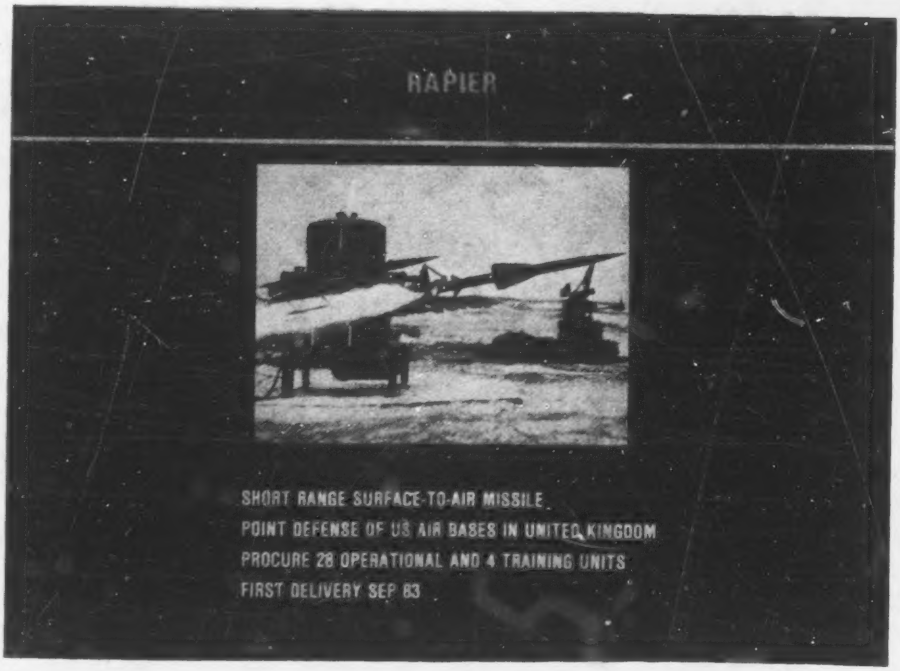
Senator Bingaman. Thank you.

Senator Goldwater. What is the physical size of that rascal? How long is it?

General Marshall. It is about 300 pounds. It is 144 inches long.

Senator Goldwater. What is its diameter?

General Gorton. 7 inches in diameter. The Sparrow is 8 inches in diameter. It weighs 327 pounds compared to the Sparrow which weighs 550.



RAPIER

SHORT RANGE SURFACE-TO-AIR MISSILE
POINT DEFENSE OF US AIR BASES IN UNITED KINGDOM
PROCURE 28 OPERATIONAL AND 4 TRAINING UNITS
FIRST DELIVERY SEP 83

The next program is an effort to increase the survivability of our air bases, principally in the United Kingdom I know you are familiar with the procurement arrangement we have made with the British with the Rapier missile to protect our bases in the United Kingdom.

We are planning to acquire 32 units. Those are for the United Kingdom.

General GOLDWATER. The NATO allies like this, don't they?

General GORTON. It is a British ground-to-air defense weapon. Of course, there are other weapons in competition with that, the Roland in Germany.

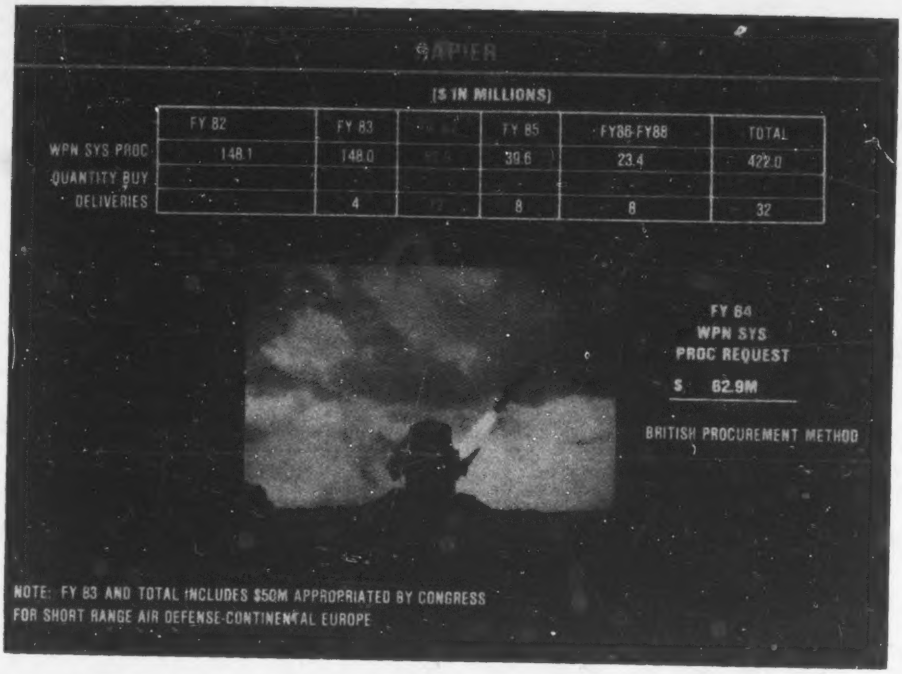
Senator GOLDWATER. That Roland is a hell of a good weapon. We have never gone ahead with that too much, have we?

General SKANTZE. No, we never did, sir. Where we are right now in talking about air base defense in Europe is that we have a joint working group between the U.S. Department of Defense and the German MOD looking at possible arrangements where we would use Roland for air base defense and they would also buy Patriot for the longer range SAMS.

Those discussions are just starting to be carried out right now.

Senator GOLDWATER. I was very impressed with the operability of that weapon system. I think Boeing was putting it together. Are they working on it or just standing still?

General SKANTZE. I think the Army canceled.



RAPIER

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
WPN SYS PROC	148.1	148.0	[illegible]	39.6	23.4	422.0
QUANTITY BUY						
DELIVERIES		4	12	8	8	32

FY 84
WPN SYS
PROC REQUEST
$ 62.9M

BRITISH PROCUREMENT METHOD

NOTE: FY 83 AND TOTAL INCLUDES $50M APPROPRIATED BY CONGRESS FOR SHORT RANGE AIR DEFENSE-CONTINENTAL EUROPE

General BAKER. The Roland here, sir, is the one that is produced in Germany.

Senator BINGAMAN. You are proposing to build a total of 32?

General GORTON. Those are 32 Rapier batteries for air base defense in the United Kingdom, sir.

General SKANTZE. Fire units.

Senator BINGAMAN. How many missiles are we talking about?

General MARSHALL. The normal load is 17 per unit plus spares. We plan a total buy of 1,766 missiles including 128 training missiles.

Senator BINGAMAN. It strikes me as a very small number of missiles and batteries as compared to the other types of figures that have been quoted here. I don't know.

General GORTON. These Rapier missiles are only for the U.S. Air Force bases in the United Kingdom, not on the continent of Europe.

General SKANTZE. Senator, this is an arrangement where we are getting the unit, we are also getting British operation and maintenance. Royal Air Force trains, maintains and operates these totally. That is part of an offset against the Trident program which the British are bringing on board for their submarine force.

General BAKER. There is also a reload ability. The number of fire units can be reloaded and brought into action quickly.

Senator BINGAMAN. The same question that the chairman asked earlier, do we have some idea of how long our capability would last in the case of some kind of conflict?

General SKANTZE. I think conventional it would probably be very effective. This missile was used down in the Falklands and did exceptionally well.

If you are talking nuclear, then it would be a very difficult situation to be able to handle.

Senator GOLDWATER. If the nuclear attack were air-lauched, we would have a better chance of defending with this type of missile?

General SKANTZE. Always. If they were using laydown nuclear weapons carried by aircraft, this is good defensive capability.

Senator GOLDWATER. Wouldn't a possible choice of the enemy if they wanted to destroy our airfields be tactical nukes fired from an aircraft? I don't think they would use the SS-20 type to get an air base, would they?

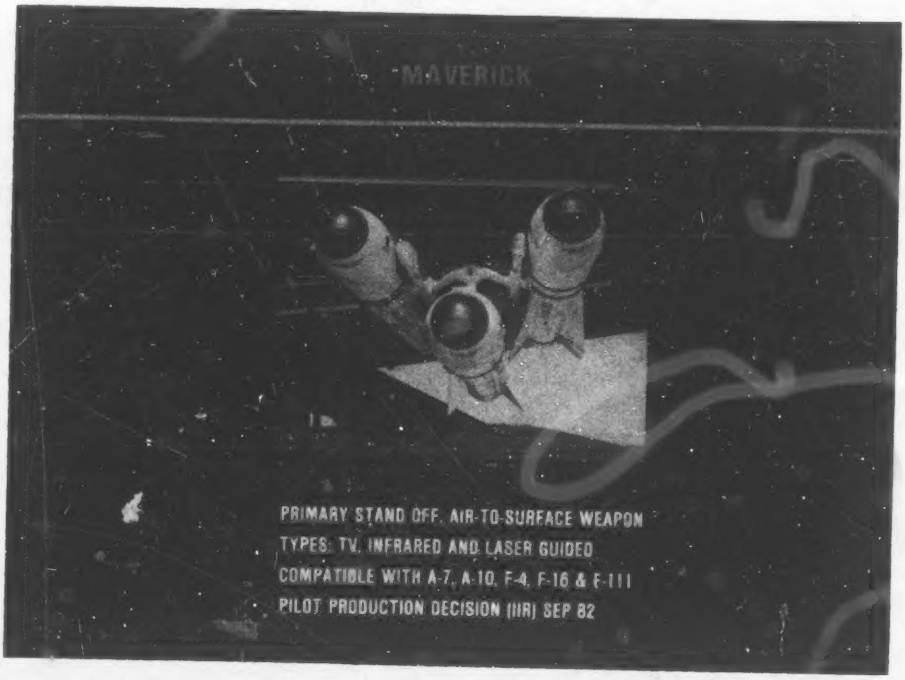
General SKANTZE. I have the impression that is fairly accurate. You know, SS-20 delivery is an option for them.

General GORTON. They could use the SS-20 in a nuclear role if they chose to, particularly against the United Kingdom bases, longer distance bases.

Senator GOLDWATER. It would be rather doubtful in my opinion. I don't think they would want to risk escalation at that point in the campaign. I am thinking of a small tactical nuke that could knock out a runway system.

General GORTON. They have that capability.

Senator GOLDWATER. My impression is that that will be their first day's exercise. We had better have something to shoot back at them.



MAVERICK

PRIMARY STAND OFF, AIR-TO-SURFACE WEAPON
TYPES: TV, INFRARED AND LASER GUIDED
COMPATIBLE WITH A-7, A-10, F-4, F-16 & F-111
PILOT PRODUCTION DECISION (IIR) SEP 82

General GORTON. I am now moving to air-to-surface weapons, the first system is the Maverick.

Senator GOLDWATER. Before you get started, General Skantze, the CBS program "60 Minutes" was rather critical of the IR Maverick.

Would you comment on the accuracy of that CBS report?

General SKANTZE. I thought the report was very inaccurate, particularly by virtue of not quoting any recent test data. As I recall, the test data they referred to was 1977. That is a timeframe when we were just starting to get into development.

All of the more recent test data which preceded the production decision showed that IR Maverick was going to be an effective system. Twenty out of 26 shots were totally successful. We fired them day, night, under dust conditions and poor visibility. We fired them against countermeasures to demonstrate that we could lock onto the targets.

I also think the CBS show did not have the data of even how successful the TV Maverick has been. I think slightly over 1,000 have been fired in various training operations. About 85 percent have been successful. The Israelis used them in the 1973 war and I think they got 40 hits out of 49, successful hits. Even the earlier ones we took to Vietnam, out of about a dozen I think about seven or eight were successful.

The point is that it really has a very good track record. I think the IR in the recent testing has proven that it is going to be an effective weapon. Unfortunately CBS chose to go back to data that was 7 years old.

I don't think they put it in perspective.

Senator GOLDWATER. Has the National Guard ever had that weapon to fire?

General SKANTZE. Not to my knowledge.

General GORTON. No. The TV Maverick they have.

Senator GOLDWATER. They had that back in the seventies?

General SKANTZE. No, not in the early seventies. In the later seventies with the A7 which has a Maverick capability, yes, sir.

Senator GOLDWATER. General, I take it from what you said that the Air Force believes that the IR Maverick is ready to go for full-scale production?

General SKANTZE. Yes, sir.

Senator GOLDWATER. I have had a very interesting correspondence with CBS. I am going to put it in the record because it is rather indicative of what they do.

Thank you.

[The correspondence follows:]

U.S. SENATE,
Washington, D.C., February 15, 1983.

Mr. WILLIAM S. PALEY,
Chairman of the Board, Columbia Broadcasting System, New York, N.Y.

DEAR BILL: Having viewed your "60 Minutes" program on the IR Maverick missile, I am writing to express my disappointment in your treatment of the issue.

To begin with, the producers apparently relied almost exclusively on outdated information to discredit the performance of the missile. An interview with a retired Air National Guard pilot, whose experience was limited to the TV Maverick, is of questionable relevance. And the interview with Russ Murray consisted of nothing more than a dusting off of early development test results obtained almost five years ago. It is old information and no matter how dressed up, it does not make a new story.

In fact, the results of the tests conducted in 1978 and 1979 led to significant changes in the software of the missile—changes which, in subsequent tests, have proven successful and will be incorporated in production missiles. That is, in fact, the very purpose of development testing: find the bugs and correct them before entering production. But, I worry over the integrity of the development process when early test results are repeatedly resurrected and paraded in the national media, as if new, to discredit a weapon system.

Next, the "60 Minutes" program clearly implied that the GAU-8 30mm cannon on the A-10 aircraft should be favored over the Maverick. If you really are persuaded that the GAU-8 is a more effective and survivable anti-tank weapon than the Maverick there are a few considerations you may have overlooked. One of these is the lethal range of the Soviet ZSU-23, SA-6, SA-7, SA-9, SA-11, SA-13, and SA-14 air defense systems. If you measure the distance from the A-10's in your films to the tanks they are firing at, you would note that those aircraft are squarely within the lethal envelope of the Soviet weapons. No aircraft will long survive in that environment.

There are two fundamental principles in combat: destroy the enemy and survive. The IR Maverick is designed to accomplish both. The IR Maverick has demonstrated better than 80 percent probability of being able to lock on, track and destroy targets even at ranges well outside the envelope of the most common battlefield air defense systems (ZSU-23 and SA-7). The IR Maverick will do all this in the dead of night. Did it occur to anyone to wonder what the GAU-8 will do for you at night?

The program stated that the Pentagon was denied an opportunity to respond because they made demands that were "unacceptable". What on earth is so unreasonable about a request to make an unedited response? I would suggest that Pentagon officials have seen enough of "60 Minutes" to know that no effort will be spared in your editing room to make those who do not agree with your premise appear foolish, inconsistent, and misinformed. It is your deck of cards. You do all the shuffling, you deal and you make up the rules—I wouldn't want to play in that game either.

The simple truth is that the Maverick has survived because it is working and we need it. Ask the pilots who may one day stake their lives on it—I have and the answer is always the same: they want Maverick.

CBS programmers succeeded in putting together what most viewers will believe is a convincing case against the IR Maverick. In truth, you have shamefully deceived the American public. You have presented only the argument of an uniformed and biased minority while rejecting the overwhelming support of a very knowledgeable majority.

The information necessary to balance your program was available. And let's not be coy. Just because someone does not wish to subject himself to public humiliation through selective editing does not mean he is any less honest or knowledgeable than those who so eagerly seek the spotlight. Isn't it time we question whether the predatory journalistic practices of "60 Minutes" have become so well known that you may never again be able to present fairly both sides of any controversy?

As a frequent viewer of "60 Minutes" I am growing increasingly dissatisfied and impatient with this sort of dishonest reporting. The American public is entitled to hear the truth—and that means both sides of the issue. Perhaps it will require an act of Congress to ensure that they do.

Sincerely,

Barry Goldwater.

CBS News,
New York, N.Y., March 3, 1983.

Hon. Barry Goldwater,
Senator, U.S. Senate,
Washington, D.C.

Dear Senator Goldwater: Bill Paley has asked me to look into the concerns you raised in your letter of February 15 relative to the 60 Minutes story on the Maverick missile system.

I personally find your letter distressing, as do the people who worked on the story at 60 Minutes. It was a difficult story to present because we found it virtually impossible to get responsible people to come forward and defend the Maverick proposal.

What is all the more distressing is that your defense of the Maverick is so spirited that an appearance by you on the 60 Minutes report would have been a valuable contribution to the public's understanding of the controversy. Yet, on repeated occasions last December, 60 Minutes was rebuffed by your staff in our efforts to have you appear.

At that time, Dorothy Bryant of your office told Mimi Edmunds, an associate producer for 60 Minutes, that you were too busy to do an interview. She suggested we turn to Senator Tower as an alternative. We did so, only to be told by his office that Senator Tower did not feel he had sufficient current research on the status of Maverick nor did he feel so strong a sense of commitment to the project to warrant going on camera for an interview. We tried in turn Senators Warner and Rudman, only to be refused by them as well. Incidentially, we also attempted to interview representatives of Hughes Aircraft, who also refused to appear.

At the same time, the Pentagon was refusing cooperation, except under the conditions referred to on the broadcast, i.e., that we promise not to edit their answers and that we give them time at the end of the report for a rebuttal. Those conditions were unacceptable for a variety of reasons. As a matter of policy, we don't give or promise anyone unedited air time in the course of a journalistic inquiry, certainly not a government agency. We have yet to see such conditions laid down for a newspaper, or a newsmagazine, and I suspect you would agree that in such cases you would regard such conditions as unreasonable. Yet you appear to feel that they are warranted in the case of 60 Minutes.

Moreover, the Pentagon insisted as a condition for cooperation that it be afforded a one-minute rebuttal at the end of the report. In order to prepare such a rebuttal, the Penatgon would have had to have seen the entire story in advance, but as a matter of policy, we do not show our stories in advance of broadcast—just as newspapers do not show their stories to interviewees in advance of publication. Furthermore, it seems to us that to permit one party in a controversy the "final word" is contrary to all fair play.

I have dwelt perhaps too long in this letter on these matters, but have done so to assure you that the absence of defenders of the Maverick on the broadcast was a source of great frustration to us. We feel we have an obligation to report on important issues, and to do so with accuracy, fairness and balance. We strive for these elements in our broadcasts. But we also face a dilemma: when one side of an issue stonewalls us, are we meeting our obligation by dropping and ignoring the story? This was the dilemma we faced with the Maverick story, and we felt that its importance, in the context of the debate over weapons spending, was too great to allow us to drop it.

As to the factual issues involved, permit me to take them in turn: first, the TV version of the Maverick is relevant for two reasons: (1) in tracing the history of the program, it seemed to us perfectly valid to portray the TV version and the reasons that led to the change (we also made clear to our viewers that the Maverick now utilizes an infrared sensing system), and (2) more important, the TV version is still in service in Europe, so that its problems remain very relevant to the pilots using them.

As to Russ Murray, you are correct in that his references were to tests conducted in 1977. He remains knowledgeable about Maverick to this day, is aware of the later tests, and nonetheless continues to believe that the system is deeply flawed.

As to your reference to tests subsequent to the 1978 and 1979 tests, you have us at a disadvantage, for we know of no such tests which have proven successful in incorporating new changes resulting from discoveries in the 1978 and 1979 tests. Our information was based first on the General Accounting Office Report to the Secretary of Defense of June 25, 1982, which was subtitled "Critical IR Maverick Issues Remain Unresolved After Five Years of Operational Testing," and on the September 21 conclusions of the Defense Systems Acquisition Review Council (DESARC), which approved a number of major modifications which will not be tested until 1985.

As you know, the GAO review was based on the 1977 Ft. Polk, the 1978 European, the 1975–80 countermeasures and the 1981 Ft. Riley tests. The GAO Report observed that "it has been demonstrated that the IR Maverick had limited success when operating under relatively benign test conditions. On the other hand, we find that it is not known whether the Maverick can work well under less-than-favorable test conditions, as may happen in combat. This is because many critical operational and technical capabilities have not been tested." In its conclusions and recommendations, the report asserted that "evidence is lacking that the IR Maverick missile system can be successful in missions it is proposed for," and went on to state, "We believe that the results of the operational testing of the IR Maverick do not yet show sufficient success to warrant moving from development to even limited procurement of the missile."

In September of 1982, DESARC approved major changes, including a new automatic focusing system, a new seeker cooling system, engineering changes affecting nearly 25 percent of the circuitry and a new reliability/maintainability validation program. These changes were approved because of unsuccessful testing of existing features. Despite the fact that these changes will not be tested until 1985, production is proceeding this year at a limited rate and full production may proceed in 1984.

It is difficult for us to reconcile these facts with your assertion that "the results of the tests conducted in 1978 and 1979 led to significant changes in the software of the missile—changes which in subsequent tests, have proven successful and will be incorporated in production missiles." It may be that new tests have been conducted since September of which you are aware but have not been publicly disclosed, or it may be that you are referring only to limited aspects of the missile software but have ignored the very real problems pointed out by GAO and DESARC. You are of course correct in asserting that the very purpose of development testing is to find those bugs and correct them before entering production, but the fact appears to be that production will begin well before the bugs are corrected and tested, which is the point our story was making.

If you inferred from our story that the GAU-8 cannon system was one we were favoring over the Maverick, we failed to make ourselves clear, and we are sorry. We showed those tests in the context of criticism of Maverick testing, which its critics have asserted has been conducted in "benign" conditions and not under realistic operational conditions. The GAU-8 has been subjected to realistic tests and extensively so. Your view of the GAU-8's vulnerability to Soviet air defense systems is not a universal one, since its advocates claim that with a highly maneuverable airplane like the A-10, pilots can approach the target at altitudes low enough to stay out of the range of SAM's radar and get out very quickly. Its advocates also claim that planes using the GAU-8 can be equipped with night-vision equipment.

As the Maverick's ability to lock on, track and destroy, the problem, it appears, is not its accuracy after a lock-on has been achieved, but the difficulty in finding and acquiring the target without having to make several passes. Once a lock has been achieved, the missile is successful, but according to its critics, it is getting locked in the first place that poses problems.

Whether or not the critics are correct, it seems to us and we hope you agree that a six billion dollar commitment to a weapons system over which there is serious disagreement warrants public discussion. We made a serious and determined effort to find those, like yourself, who support the system, to speak to that issue. We were not happy about our failure in this respect. We did, however, believe it important to ourselves and to our audience to present this report.

Sincerely,

VAN GORDON SAUTER.

U.S. SENATE,
Washington, D.C., March 11, 1983.

Mr. VAN GORDON SAUTER,
President, CBS News,
New York, N.Y.

DEAR MR. SAUTER: Thank you for your response to my letter to Mr. Paley. You have raised a number of points which I would like to address.

First, you mentioned that on repeated occasions last December, "60 Minutes" was "rebuffed" by my staff in your efforts to obtain an interview. Please recall that I underwent open heart surgery on November 4th. I spent the month of December recuperating from that operation and declined all requests for interviews.

But, while surgery may explain my staff's reluctance to commit me to any interviews it does not answer this question: Had it not been for the operation, would I have granted the interview? Quite frankly, I probably would not.

One of the points in my letter to Mr. Paley which you did not address in your reply, was the growing reluctance on the part of many individuals to appear before the "60 Minutes" cameras. That reluctance is not hard to understand.

The solution, if you really do wish to provide the public with a balanced presentation, is to allow those who are under attack the chance to make their own statement. But, you say you cannot permit this as a "matter of policy." At CBS, which ranks higher on the scale of journalistic values; balanced, honest reporting or an arbitrary "matter of policy?"

You also invoke the defense of "policy" when refusing to give the last word to one party in a controversy because it would be contrary to "all fair play." That objection is easily avoided by giving both parties equal time for an unedited statement. Toss a coin to see who goes last. But, doesn't it say something about the impartiality of "60 Minutes" when you realize that in most cases only one party would find it necessary to make such a request?

Next, it appears that whoever researched the IR Maverick for "60 Minutes" completely overlooked the most relevant testing that has yet been conducted on the missile. That testing, known as the Initial Operational Test and Evaluation (IOT&E) was performed between February 1981 and August 1982. It was on the basis of this testing that the September 1982 DSARC gave the production go-ahead.

It was during the IOT&E tests that the major software modifications to which I referred in my letter of February 15 were evaluated. Those tests were quite successful and, in my opinion, were carried out in a manner which realistically simulated the varying conditions in which Maverick may be employed. Flights were conducted at each of the following locations (chosen, obviously, for their widely differing climates): Ft. Riley, Kansas; Ft. Drum, New York; Eglin Air Force Base, Florida; Utah Test and Training Range, Utah; China Lake, California. The results of those tests were as follows: 26 firings, 20 direct hits. Of the six which were not direct hits:

Two failed because of faulty solder joints (which have now been replaced with metal clips);

One failed due to maintenance error—failure to connect a test circuit;

One failed as a result of improper software (which has been corrected);

One failed as a result of a combination of errors during a "hand-off" launch;

One failure—cause remains unknown because there was no telemetry.

Not a bad record, in my opinion. I might point out that the GAO did not have this information when they published their June 1982 report. In fact, the GAO report was based on only about ten percent of the IR Maverick testing which has been conducted to date.

Was this information available to the "60 Minutes" crew? All they had to do was call the Pentagon's Maverick program office or contact my staff or the staff of the Senate Armed Services Committee—any one of these sources would have been able to provide the information necessary to balance your presentation. Would they have appeared on camera? Probably not. But does that mean they are not speaking the truth? Hardly.

Allow me to repeat a question I raised in my February 15th letter: Isn't it time we question whether the journalistic practices of "60 Minutes" have become so well known that you may never again be able to present fairly both sides of any controversy?

Now, as to Russ Murray, your reliance on his expertise is misplaced. In a phone conversation on March 10 he confirmed that he made it clear to CBS that he had not had access to any technical or classified data since leaving office with the Carter Administration. Any subsequent information he acquired on the Maverick has come from the newspapers. He also said that he had made no effort to find out from any knowledgeable sources in the Penatagon what the later tests on the Maverick have shown. Like the GAO and like "60 Minutes", Russ Murray's knowledge of the Maverick did not include the IOT&E results.

On the issue of whether or not the Maverick has undergone realistic testing to simulate combat conditions (as you seem to think the GAU-8 has) I would remind you that of the two weapons only one has been used in actual combat. During the 1973 Arab-Israeli War the Israelis fired 49 TV Mavericks at Egyptian armor—40 were direct hits. The Egyptians were so impressed with Maverick that they put it at the top of their list of requested purchases of U.S. weapons. I know of no more eloquent testimony to a weapon's effectiveness. I also consider it significant that of the 1,414 Maverick missiles ever fired, 85 percent were direct hits. I am aware of no other weapon that comes close to that record of performance.

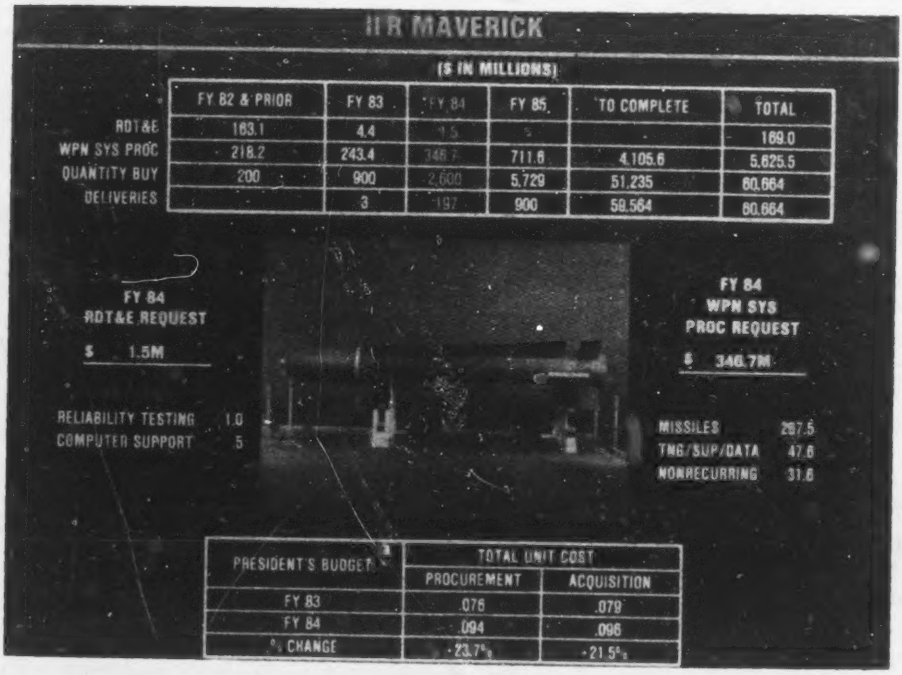
In your response you mentioned the DSARC-proposed modifications which will not be evaluated until 1984/85 (during Follow-On Test and Evaluation, FOT&E). Your statement that these represent "very real problems" approved because of "unsuccessful testing of existing features" is grossly misleading. What these modifications represent are reliability and producibility improvements. Had the testing been "unsuccessful" Maverick would not have scored 20 direct hits out of 26 firings and received the approval of the DSARC. The changes approved by the DSARC did not include a "new" automatic focusing system, it approved certain modifications to the current system. The performance of the current system is satisfactory, it can be made better. There is no plan to install a "new seeker cooling system," the current cryogenic cooling engine is meeting the 200 hour reliability requirement. An alternative engine has been examined but it appears that it will not be necessary. And as to the 'engineering changes affecting nearly 25 percent of the circuitry" those changes reflect producibility improvements not performance modifications. Those improvements are designed to make production of the missile more efficient and less expensive—they are not the results of any "unsuccessful testing."

It remains my firm conviction that those responsible for "60 Minutes" are more committed to sensationalism than they are to providing the public with balanced, well-researched reports. The "60 Minutes" Maverick story was a perfect example—it was based on out-dated information, the opinions of critics who had little or no recent knowledge of the system, and it omitted the most significant testing which has yet been conducted on the missile. In short, it was a story cut from the same fabric that makes up most sensationalized reports: half-truths and omissions.

The public deserves honesty, not what you are giving them.

Sincerely,

BARRY GOLDWATER.



IIR MAVERICK

($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
RDT&E	163.1	4.4	1.5	-	-	169.0
WPN SYS PROC	218.2	243.4	346.7	711.6	4,105.6	5,625.5
QUANTITY BUY	200	900	2,600	5,729	51,235	60,664
DELIVERIES	-	3	197	900	59,564	60,664

FY 84
RDT&E REQUEST
$ 1.5M

RELIABILITY TESTING	1.0
COMPUTER SUPPORT	.5

FY 84
WPN SYS
PROC REQUEST
$ 346.7M

MISSILES	267.5
TNG/SUP/DATA	47.6
NONRECURRING	31.6

PRESIDENT'S BUDGET	TOTAL UNIT COST	
	PROCUREMENT	ACQUISITION
FY 83	.076	.079
FY 84	.094	.096
% CHANGE	+23.7%	+21.5%

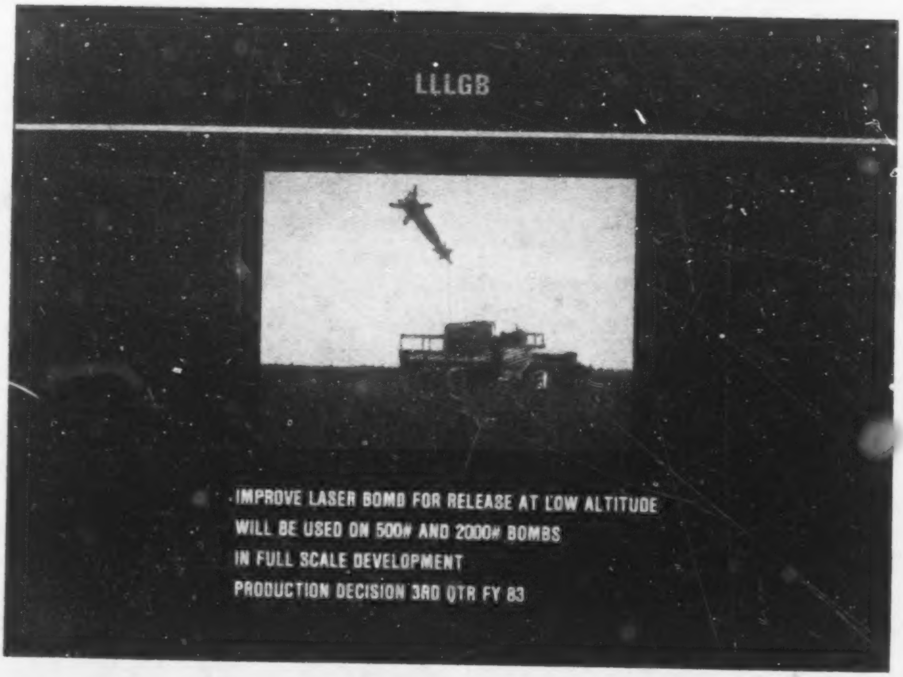
General GORTON. We are asking to move up from the pilot production of 900 missiles authorized in 1983 to begin with our rampup of the IR Maverick in the 1984 budget.

General SKANTZE. Incidentally, Mr. Chairman, we are about to select a second source for the IR Maverick in May. So, we expect to have two qualified sources here in a couple of years to keep that competitive aspect going.

Senator GOLDWATER. Has this information been released?

General SKANTZE. Yes, sir. The selection has not been made. The source selection is in progress. The target date is to announce it in May.

Senator GOLDWATER. Thank you.



LLLGB

- IMPROVE LASER BOMB FOR RELEASE AT LOW ALTITUDE
- WILL BE USED ON 500# AND 2000# BOMBS
- IN FULL SCALE DEVELOPMENT
- PRODUCTION DECISION 3RD QTR FY 83

General GORTON. Low level laser guided bomb is another procurement this year. It allows us to mate on a 500-pound or 2,000-pound bomb to a laser sensor, and air foil group, providing better low-altitude short-range standoff.

Senator GOLDWATER. You have not reached your production decision yet?

General MARSHALL. No, sir. We were planning to reach that decision last fall, but because of some problems in our test program we have temporarily halted that program for failure analysis. We think we have that failure pinpointed and we will resume testing this week.

We plan 11 more drops and we plan to make that production decision about June.

Senator GOLDWATER. You are testing this out of White Sands?

General MARSHALL. Yes, sir, and at China Lake. We have had some at White Sands and also at Eglin.

Senator GOLDWATER. Could you tell us briefly what the problems were that you ran into?

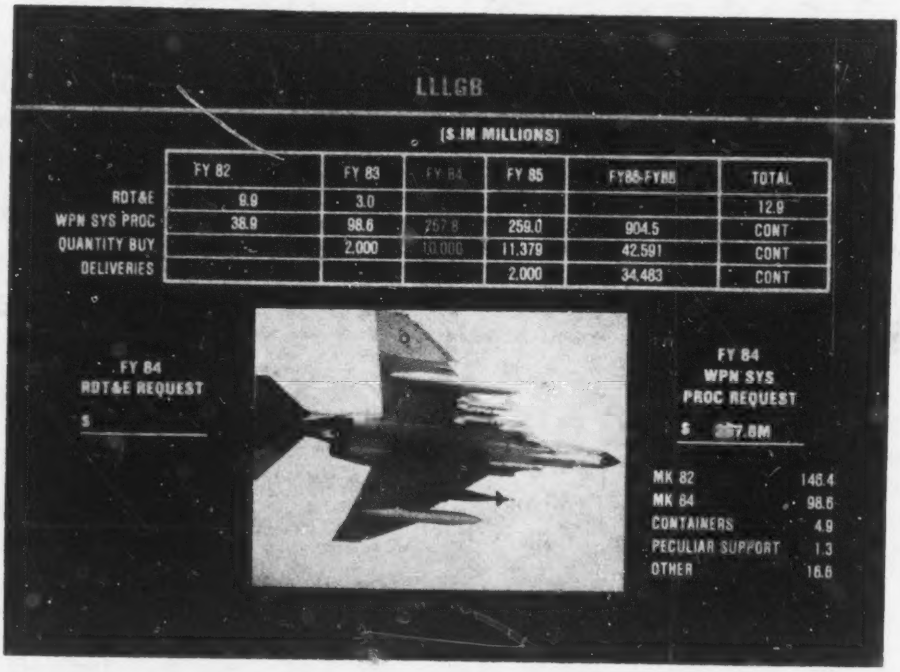
General MARSHALL. Yes, sir. We had two problems. In the production missiles we found one that went ballistic, that didn't guide. We found a connector had a bad pin. It was a shorted pin. We went back and looked at a failure analysis on that.

We did a complete failure analysis and found that our test equipment would not have found that particular short. We went to that connector pin and found a couple possible shorts. That was one problem on one missile.

The biggest problem was in our microprocessor, the little computer that is the brain of the system. We found that if the battery ramps up at a slower rate than planned or has a spike or a ramp in the build-up of current, that you could get an unsynchronous condition with the clock and in some of our failures that were occuring, the battery was not building up at quite the right rate and, therefore, the microprocessor was not put into motion, it did not issue the subsequent discrete signals that would cause the weapon to guide.

We have duplicated every failure in the laboratory with this problem.

So, we have a revised microprocessor that will be going into the new missiles and will be tested.



LLLGB

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E	9.9	3.0				12.9
WPN SYS PROC	38.9	98.6	257.8	259.0	904.5	CONT
QUANTITY BUY		2,000	10,000	11,379	42,591	CONT
DELIVERIES				2,000	34,483	CONT

FY 84
RDT&E REQUEST
$

FY 84
WPN SYS
PROC REQUEST
$ [illegible]7.8M

MK 82	146.4
MK 84	98.6
CONTAINERS	4.9
PECULIAR SUPPORT	1.3
OTHER	16.6

Senator GOLDWATER. What is your average altitude of release for this weapon?

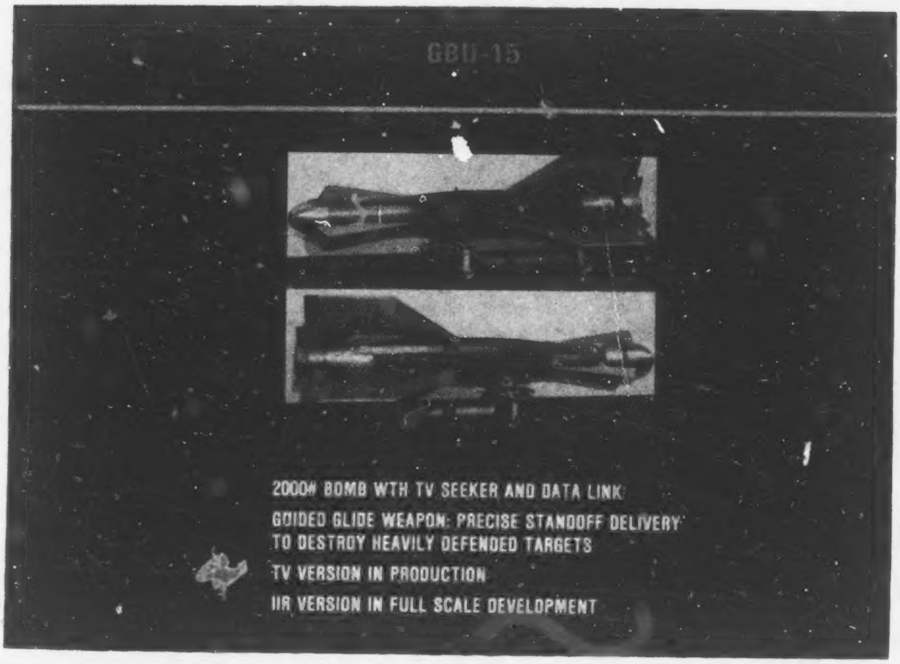
General MARSHALL. It is designed to be released as low as 200 feet, but that does not mean level flight. When it drops away in order to get safe separation distance it will drop about 175 feet below the airplane.

So, the way we launch it at 200 feet, we will launch it at a 5° loft. So actually it will come off a little higher than 200 feet and in fact may come off as high as 500 feet.

Senator GOLDWATER. Does it reach an altitude where low temperatures will prevail over the battery system?

General MARSHALL. No, sir. We have not had any temperature problems with the battery. In fact, we cold soaked it on many of the aircraft.

The bomb will be at altitude on aircraft for some period of time so that has not been the problem.



GBU-15

2000# BOMB WTH TV SEEKER AND DATA LINK

GUIDED GLIDE WEAPON: PRECISE STANDOFF DELIVERY TO DESTROY HEAVILY DEFENDED TARGETS

TV VERSION IN PRODUCTION

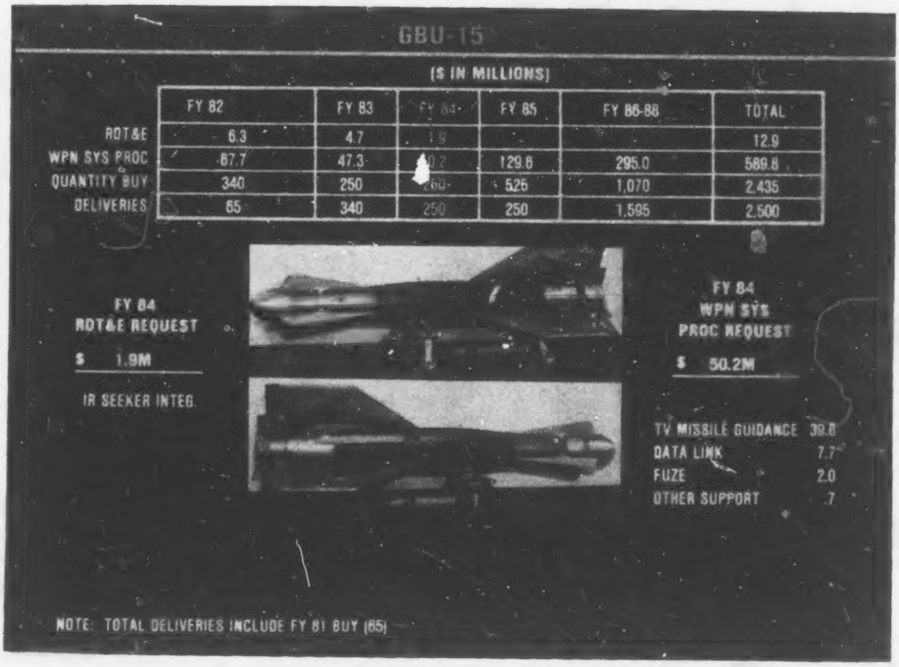
IIR VERSION IN FULL SCALE DEVELOPMENT

General GORTON. The next system is the GBU-15. Currently we have been procuring the TV front end GBU-15. This is a glide bomb with excellent range when launced from altitude. We are beginning to develop an IR Seeker for the front of this bomb weapon that is included in our funding.

Senator GOLDWATER. Why do we need both GBU-15 and the LLLGB?

General GORTON. The triple LGB also fits on a 500-pound bomb. It gets you a lower altitude launch.

General MARSHALL. Of course, the GBU also has a lot more range. In the Lebanon conflict the Israelis launched the GBU-15's at about [deleted] feet and used those to go against some of those sites, a range of about [deleted] miles.



GBU-15

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
RDT&E	6.3	4.7	1.9			12.9
WPN SYS PROC	67.7	47.3	[illegible]0.2	129.6	295.0	589.8
QUANTITY BUY	340	250	260	526	1,070	2,435
DELIVERIES	65	340	250	250	1,595	2,500

FY 84
RDT&E REQUEST
$ 1.9M

IR SEEKER INTEG.

FY 84
WPN SYS
PROC REQUEST
$ 50.2M

TV MISSILE GUIDANCE	39.8
DATA LINK	7.7
FUZE	2.0
OTHER SUPPORT	.7

NOTE: TOTAL DELIVERIES INCLUDE FY 81 BUY (65)

Senator GOLDWATER. Do you have any idea what the CEP is at that range?

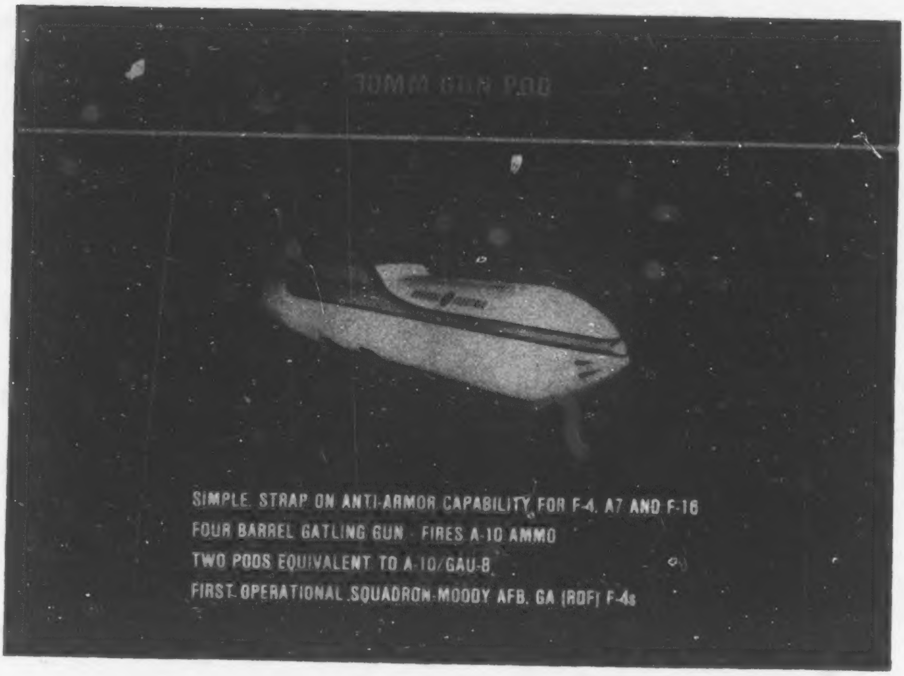
General MARSHALL. On the GBU-15 the weapon system—let me explain the weapon. It is either a TV or an IR picture that is data linked back to the weapon system operators in the back seat of an F-4. He flies that weapon with a little joystick. He can put that GBU-15 in there.

Senator GOLDWATER. I am talking about [deleted] miles.

General MARSHALL. He still has the data link coming back to his airplane. He is riding that bomb. He sees the picture out of the front end of that weapon.

General SKANTZE. It is fairly expensive and the number is small because they are high value target kind of weapons. They are launched from two-seat airplanes, either F-4's or F-111's.

So, the guy in the back seat even though you have broken away as long as you have line of sight, you keep flying it.



30MM GUN POD

SIMPLE STRAP ON ANTI-ARMOR CAPABILITY FOR F-4, A7 AND F-16

FOUR BARREL GATLING GUN - FIRES A-10 AMMO

TWO PODS EQUIVALENT TO A-10/GAU-8

FIRST OPERATIONAL SQUADRON-MOODY AFB, GA (RDF) F-4s

General GORTON. As you recall, we have a program to provide a strap-on 30-millimeter gun pod capability for our tactical fighters. Two of these pods equate to firepower equal to the GAU-8 gun on the A-10.

Senator GOLDWATER. You had on the F-4, didn't you?

General GORTON. We had a 20-millimeter gun pod. That was for those models of the F-4 that did not have an internal gun.

We also can put these 30-millimeter gun pods on F-4's. In fact, the first operational unit with 30-millimeter gun pod is an Air Force unit designated to support the rapid deployment force.

Senator GOLDWATER. You hang that outboard or a fuselage centerline?

General GORTON. It can be mounted on a fuselage centerline where we mounted the old gun pod on the F-4 and it can be mounted on the intermediate rack.

General MARSHALL. On the F-16 we had a vibration problem with the centerline mount. We are not planning to put it on the F-16 centerline.

Senator GOLDWATER. I know flying that A-10 it had a hell of a recoil.

What does that do to an F-4? A-7 will take it. F-16, for example?

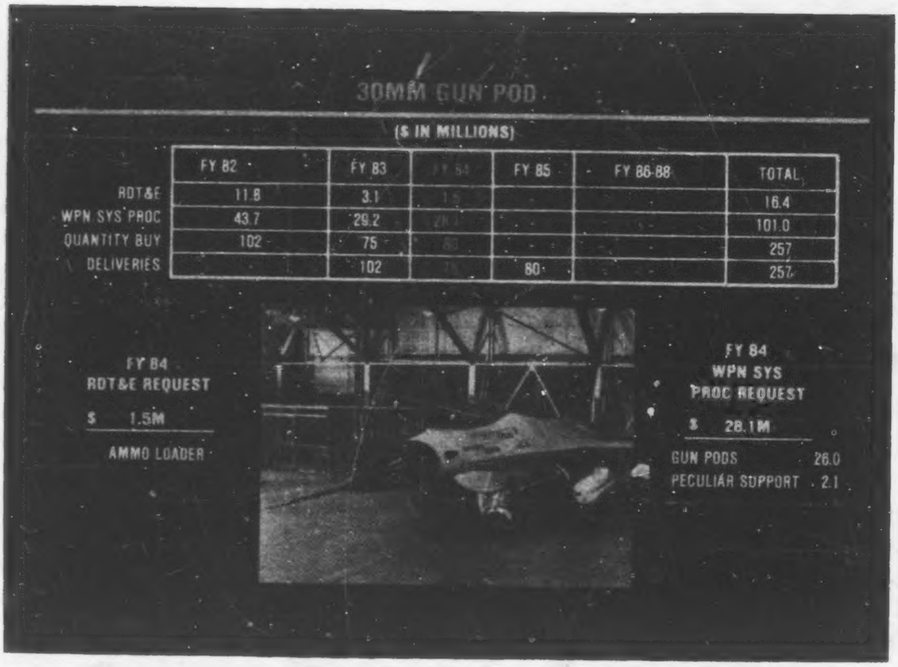
General GORTON. I can't comment specifically on the F-16, but there is not any noticeable effect. You feel the guns go off. It does not necessarily slow you down in that regard.

Senator GOLDWATER. On the A-10 it slows it down?

General SKANTZE. This is four barrels versus the seven barrel.

General GORTON. It takes two of these pods to get the same rate of power that you get out of the GAU-8 gun.

Senator GOLDWATER. It is still pretty good.



30MM GUN POD

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
RDT&E	11.8	3.1	1.5			16.4
WPN SYS PROC	43.7	29.2	28.1			101.0
QUANTITY BUY	102	75	80			257
DELIVERIES		102	75	80		257

FY 84
RDT&E REQUEST
$ 1.5M
AMMO LOADER

FY 84
WPN SYS
PROC REQUEST
$ 28.1M

GUN PODS	26.0
PECULIAR SUPPORT	2.1

General **Gorton**. Yes, sir.

We are asking for funding for 80 of these pods.

Senator **Goldwater**. What is that per pod?

General **Gorton**. One can get a program figure by adding the number in, but we will get you a unit cost figure.

Senator **Goldwater**. Would that price include the gun or is it just the pod?

General **Skantze**. The whole pod.

Senator **Goldwater**. How many rounds will that thing carry?

General **Skantze**. We will get that.

Senator **Goldwater**. You can supply that for the record?

General **Skantze**. Yes, sir.

[The information follows:]

STRAP-ON 30-MILLIMETER GUN POD

The contract unit price for the 30mm gun pod was $324,000 for the 75 pods purchased in fiscal year 1983. The unit price will be $333,000 for the 80 pods purchased in fiscal year 1984 (on a negotiated firm fixed price option on the fiscal year 1983 contract). If the associated support equipment is considered, the total program unit price in fiscal year 1983 and fiscal year 1984 would be $389,000 and $351,000 respectively. These gun pods each have the capacity to carry 353 rounds of ammunition.

Senator **Goldwater**. What are we paying now for rounds? A round $250?

General **Skantze**. No; it is much lower than that.

General **Gorton**. For the 30-millimeter round?

Senator **Goldwater**. Yes.

General **Gorton**. It is much lower than that. We will get that. The capacity on the gun pod is 353 rounds per gun pod.

[The information follows:]

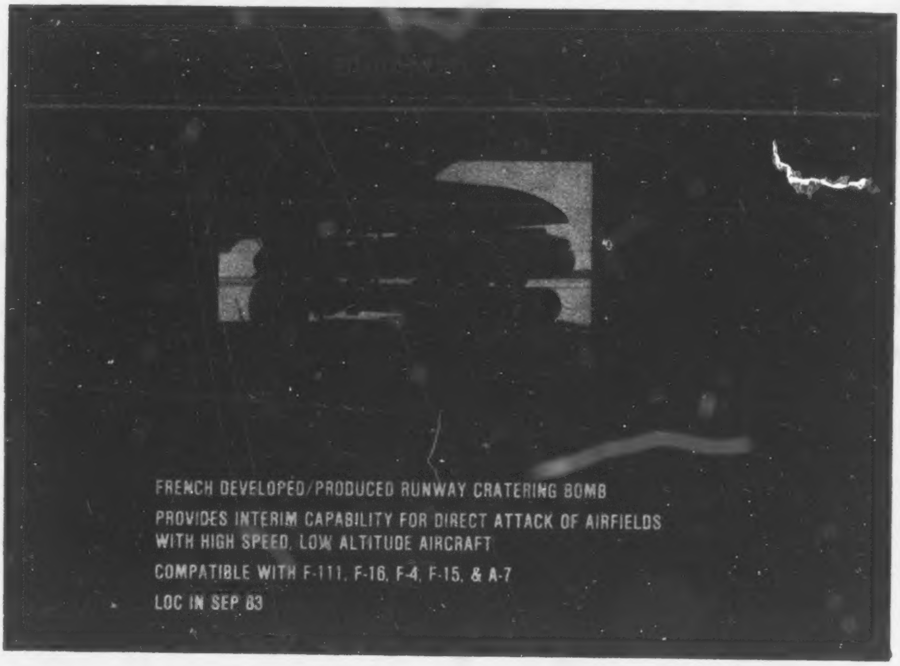
COST OF 30 MILLIMETER ROUND

The fiscal year 1984 unit costs for 30 millimeter round are:

30mm training	$10.46
30mm high explosive incendiary	15.93
30mm armor piercing incendiary	20.17

Senator **Goldwater**. Rate of fire with four barrel is what?

General **Gorton**. 2,400 rounds per minute, sir.



FRENCH DEVELOPED/PRODUCED RUNWAY CRATERING BOMB

PROVIDES INTERIM CAPABILITY FOR DIRECT ATTACK OF AIRFIELDS WITH HIGH SPEED, LOW ALTITUDE AIRCRAFT

COMPATIBLE WITH F-111, F-16, F-4, F-15, & A-7

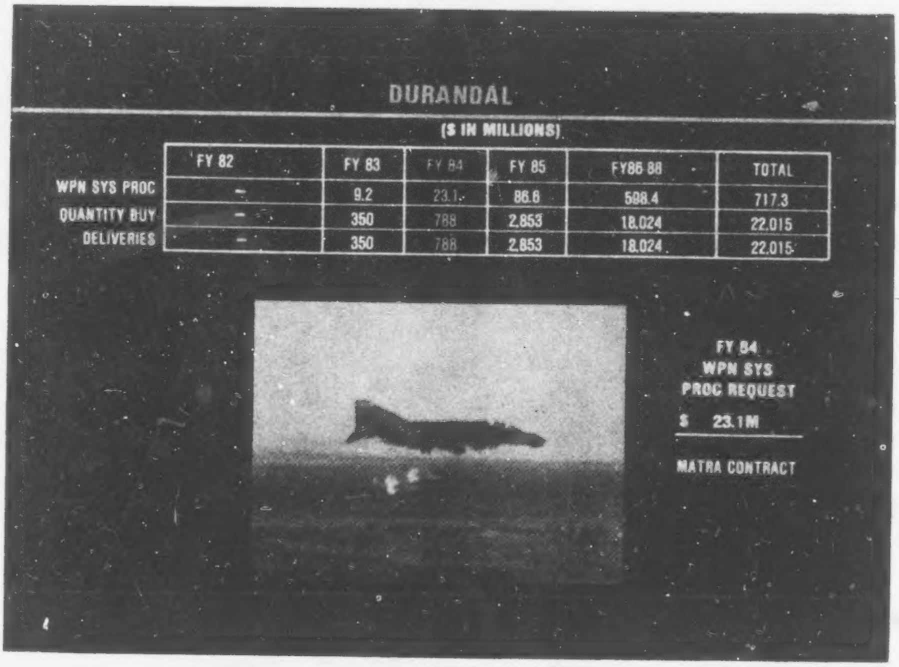
LOC IN SEP 83

The next program is a French weapon called Durandal. It provides our direct attack fighter with the capability to damage Soviet airfield runways. Runways are very difficult targets, as you are aware.

This Durandal weapon is a boosted weapon. You fly directly over the runway and release them. They are parachute retarded, pointed down, and then boosted through the surface of the runway so that when they explode they heave up the runway surface. This is our first true specifically designed runway busting munition and we are buying it from the French.

Senator **Goldwater**. This is not the one I saw tested at Eglin where you fly down the runway and released the weapon and then it puts down hundreds of pods that blow up?

General **Gorton**. No, sir. We will be talking about that in a moment. That is the boosted kinetic energy penetration. This is a full round, it is a bomb.



DURANDAL

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86 88	TOTAL
WPN SYS PROC	–	9.2	23.1	86.6	598.4	717.3
QUANTITY BUY	–	350	788	2,853	18,024	22,015
DELIVERIES	–	350	788	2,853	18,024	22,015

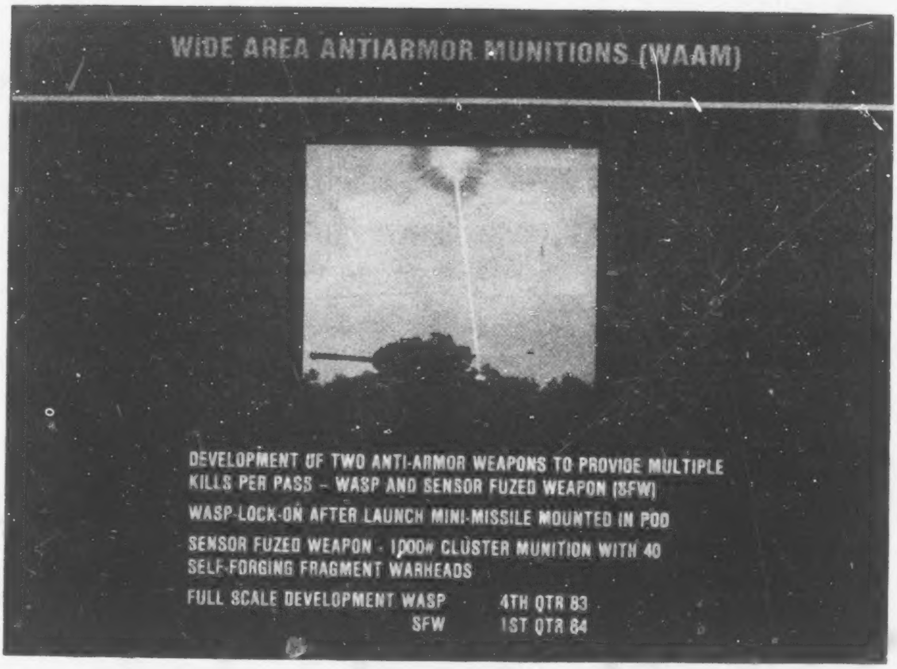
FY 84
WPN SYS
PROC REQUEST
$ 23.1M

MATRA CONTRACT

This is a picture of two weapons coming off. Those are parachute retarded and they will orient themselves flying directly over the runway and orient down and boost themselves through the hard surface of the runway.

Senator GOLDWATER. At low altitude?

General GORTON. At low altitude. We have tested them up to 630 knots at about 250 feet. That allows us to make one pass directly down the runway. They will do a significant bit of damage to the runway.



WIDE AREA ANTIARMOR MUNITIONS (WAAM)

DEVELOPMENT OF TWO ANTI-ARMOR WEAPONS TO PROVIDE MULTIPLE KILLS PER PASS – WASP AND SENSOR FUZED WEAPON (SFW)

WASP-LOCK-ON AFTER LAUNCH MINI-MISSILE MOUNTED IN POD

SENSOR FUZED WEAPON - 1000# CLUSTER MUNITION WITH 40 SELF-FORGING FRAGMENT WARHEADS

FULL SCALE DEVELOPMENT WASP 4TH QTR 83
SFW 1ST QTR 84

We are returning to some of our submunitions programs, Mr. Chairman, under the wide area of antiarmor munitions [WAAM] program.

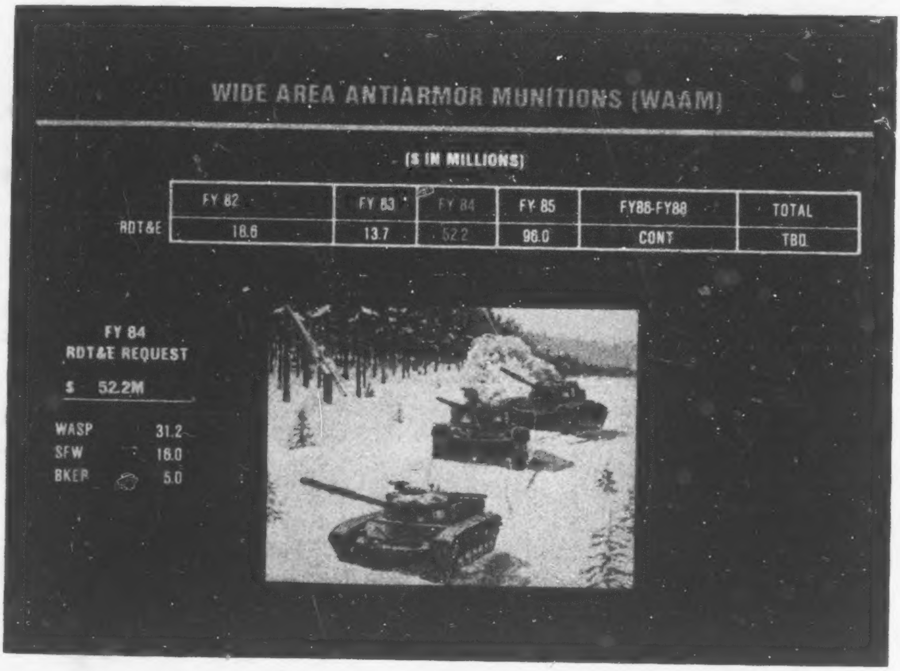
We are looking at two particular weapons in this category, the WASP which is the minimissile that individually seeks out tanks and the sensor fuzed weapon with its SKEET submunitions, a picture of which is shown here.

The SKEET submunitions orients itself to a heat source and fires a slug through the top of the tank into the engine. That is a submunition that would be packaged in a dispenser and released over a column of tanks.

Senator BINGAMAN. Let me ask on this. On the comments about this WAAM system Senator Hart's paper says, "All of the WAAM munitions have already failed Air Force development tests. These are very complex inherently easy to decoy and unlikely to work in combat."

What is your reaction to that? Do you have tests that could have shown real problems with this?

General SKANTZE. We have just gone through the validation tests of these submunitions. In fact, last October one of them, the Antiarmor Cluster Munition [ACM], we decided to terminate because it did not seem to offer much effectiveness, but the WASP and the Sensor Fused weapon look as though they are going to work out well.



WIDE AREA ANTIARMOR MUNITIONS (WAAM)

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E	18.6	13.7	52.2	96.0	CONT	TBD

FY 84
RDT&E REQUEST

$ 52.2M

WASP	31.2
SFW	16.0
BKEP	5.0

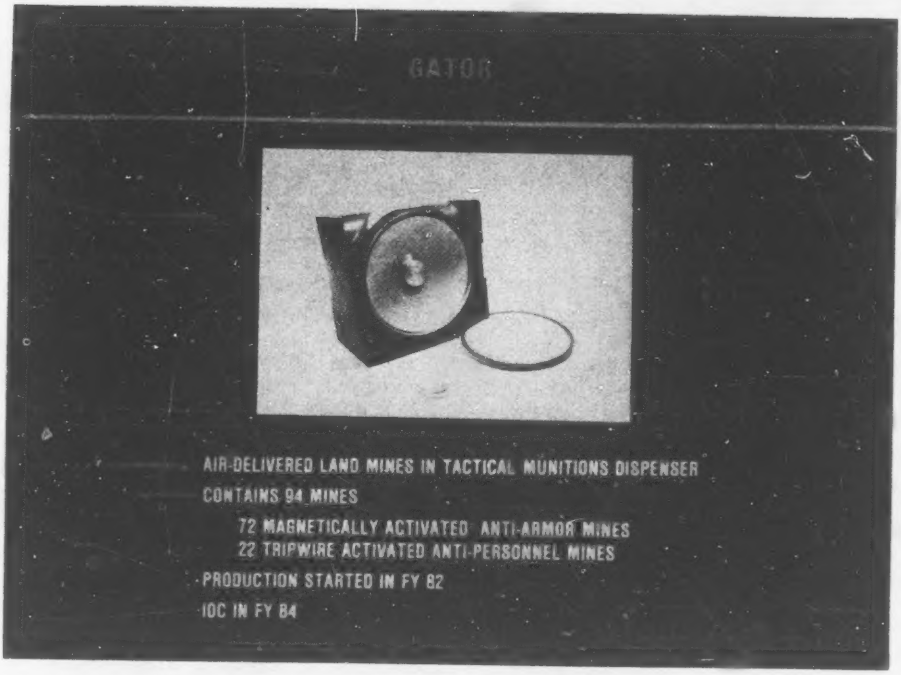
We are just moving into full-scale development. We have not started that process yet. We went through the validation phase which says basically that the munitions work the way you want it to work.

In fact, we have had some tests like, you know, this would work not only in conjuction with single airplanes, but could be used, some of these munitions on long-range standoff weapons.

In fact, as recently as several months ago an Army-fired missile which was guided by an airborne radar at White Sands dispensed five similar submunitions and took out five tanks. So, from the point of view of being confident that there are techniques that are going to work, we feel very comfortable with that.

But we are going into the full-scale development which is designed to make sure we have a highly reliable repeatable kind of munition.

General MARSHALL. We also have another member of this family, the combined effect bomblet that is in production. That testing has gone very well and that is in production now.

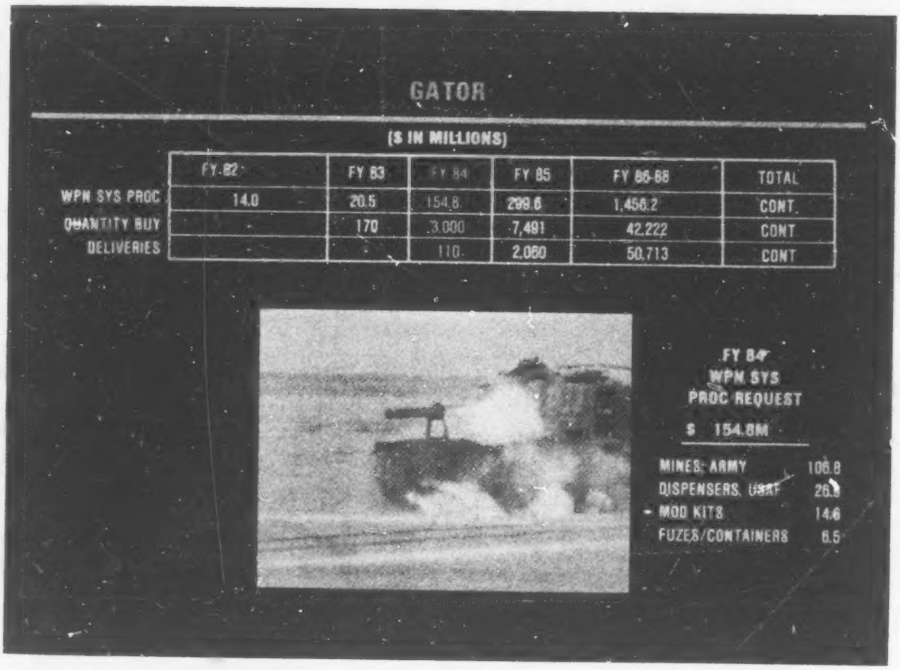


GATOR

- AIR-DELIVERED LAND MINES IN TACTICAL MUNITIONS DISPENSER
- CONTAINS 94 MINES
  - 72 MAGNETICALLY ACTIVATED ANTI-ARMOR MINES
  - 22 TRIPWIRE ACTIVATED ANTI-PERSONNEL MINES
- PRODUCTION STARTED IN FY 82
- IOC IN FY 84

General GORTON. Another program in our munitions program is the Gator Mine. We are working that jointly with the Army. It provides scatterable mines that will be highly useful in interdicting second echelon and also something one would want to deploy over airfields to slow down their repair capability once we have made initial attack.

This program is ongoing in procurement and the weapon is dispensed by directly flying over it with a tactical munitions dispenser.



GATOR

($ IN MILLIONS)

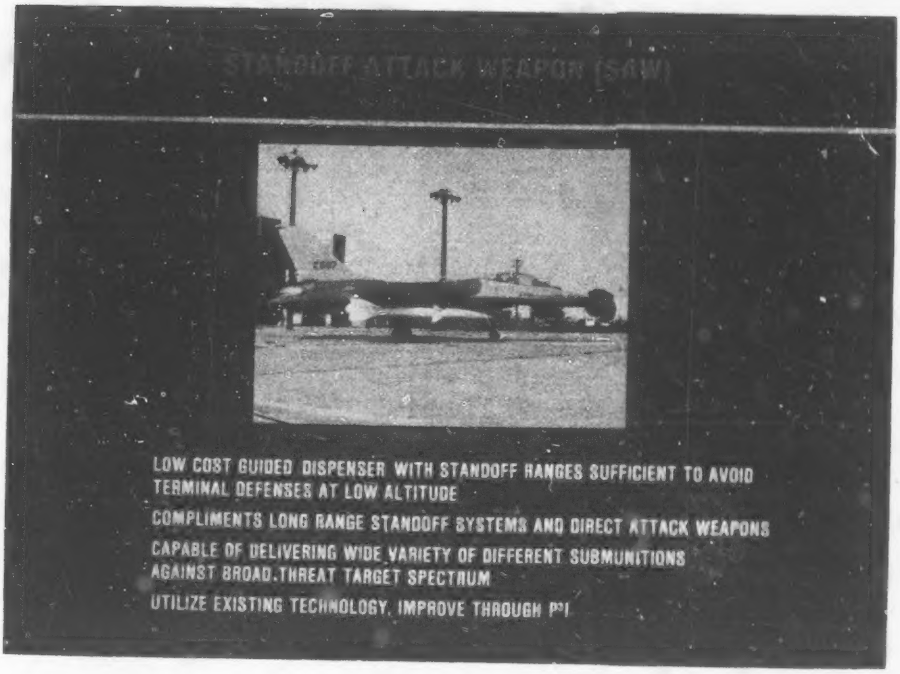
	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
WPN SYS PROC	14.0	20.5	154.8	299.6	1,456.2	CONT.
QUANTITY BUY	-	170	3,000	7,491	42,222	CONT
DELIVERIES	-	-	110	2,060	50,713	CONT

FY 84
WPN SYS
PROC REQUEST

$ 154.8M

MINES, ARMY	106.8
DISPENSERS, USAF	26.9
MOD KITS	14.6
FUZES/CONTAINERS	6.5

The Army has had this and we have been very supportive of this particular program. They have been procuring it. It is effective against tanks as well. This is a picture of a test, remote controlled tank running across Gator mines.



STANDOFF ATTACK WEAPON (SAW)

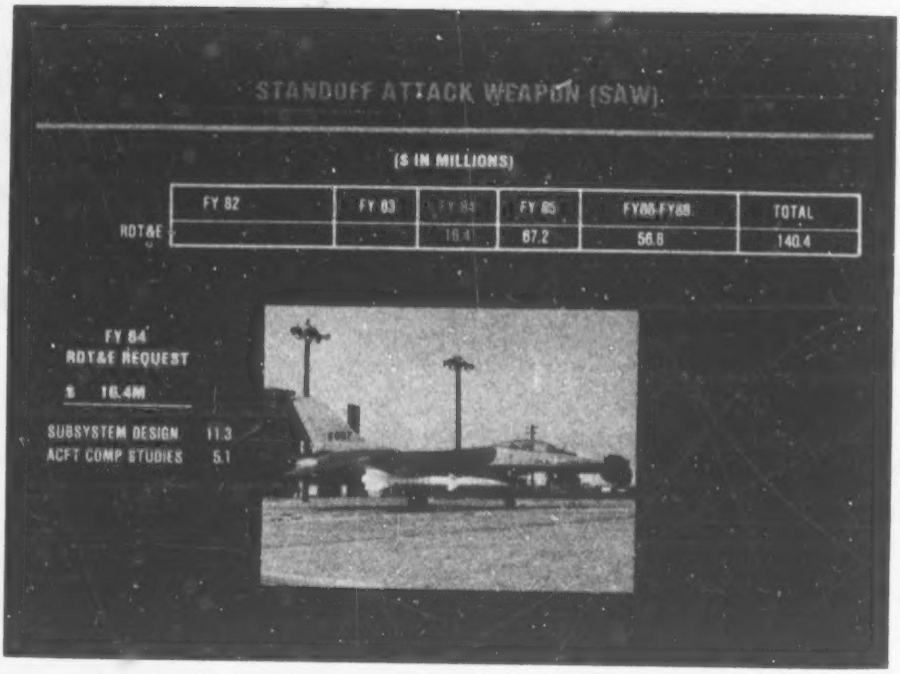
LOW COST GUIDED DISPENSER WITH STANDOFF RANGES SUFFICIENT TO AVOID TERMINAL DEFENSES AT LOW ALTITUDE

COMPLIMENTS LONG RANGE STANDOFF SYSTEMS AND DIRECT ATTACK WEAPONS

CAPABLE OF DELIVERING WIDE VARIETY OF DIFFERENT SUBMUNITIONS AGAINST BROAD THREAT TARGET SPECTRUM

UTILIZE EXISTING TECHNOLOGY, IMPROVE THROUGH P^3I

The next program is a new start in fiscal year 1984, Mr. Chairman. It is the first of a family of short-range conventional standoff munitions designed to take on hard targets and terminal threat targets with about a [deleted] nautical mile range.



STANDOFF ATTACK WEAPON (SAW)

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E			16.4	67.2	56.8	140.4

FY 84
RDT&E REQUEST
$ 16.4M

SUBSYSTEM DESIGN	11.3
ACFT COMP STUDIES	5.1

We are requesting for the first time funding for full-scale development of SAW in fiscal year 1984. This would complement the more longer range conventional standoff.

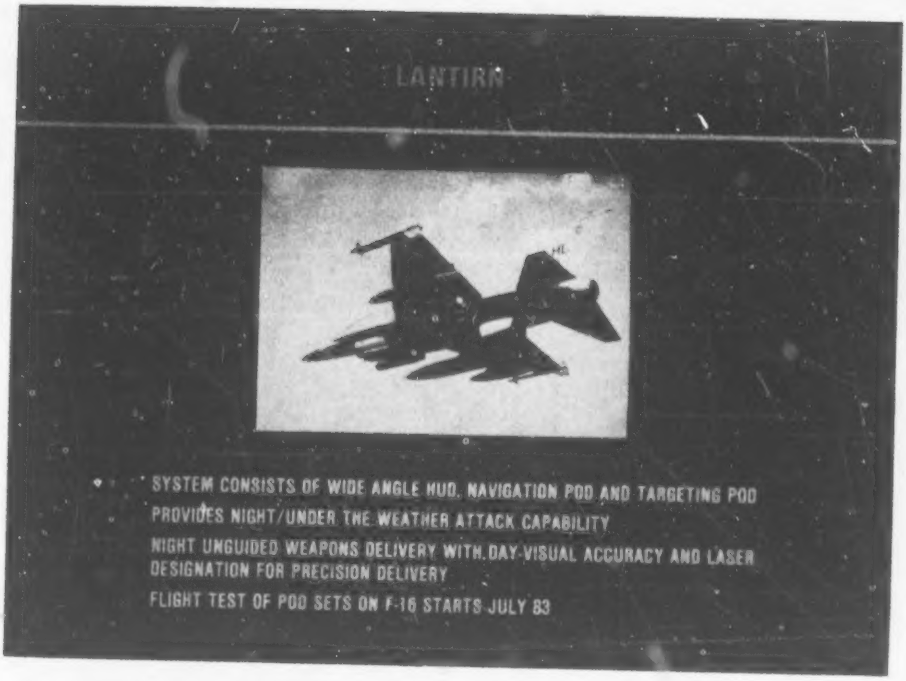
Senator GOLDWATER. You may continue. I have to make a call, but keep on going.

General GORTON. The essence of the conventional standoff weapon, SAW, is that it must be affordable. It is relatively inexpensive and carries a variety of payloads, either submunitions or a Lantin warhead.

The essence of the system is that it should be affordable and relatively inexpensive. As I said, it is a new start in 1984 and the first funds are requested for the beginning of the full-scale development.

Senator BINGAMAN. When you say relatively inexpensive, do you have some estimate as to the unit cost?

General GORTON. We would hope we could keep the unit cost in the $150,000 or below category. That is dependent on the type of guidance one selects for the system.



LANTIRN

- SYSTEM CONSISTS OF WIDE ANGLE HUD, NAVIGATION POD AND TARGETING POD
- PROVIDES NIGHT/UNDER THE WEATHER ATTACK CAPABILITY
- NIGHT UNGUIDED WEAPONS DELIVERY WITH DAY-VISUAL ACCURACY AND LASER DESIGNATION FOR PRECISION DELIVERY
- FLIGHT TEST OF POD SETS ON F-16 STARTS JULY 83

The next system is Lantirn.

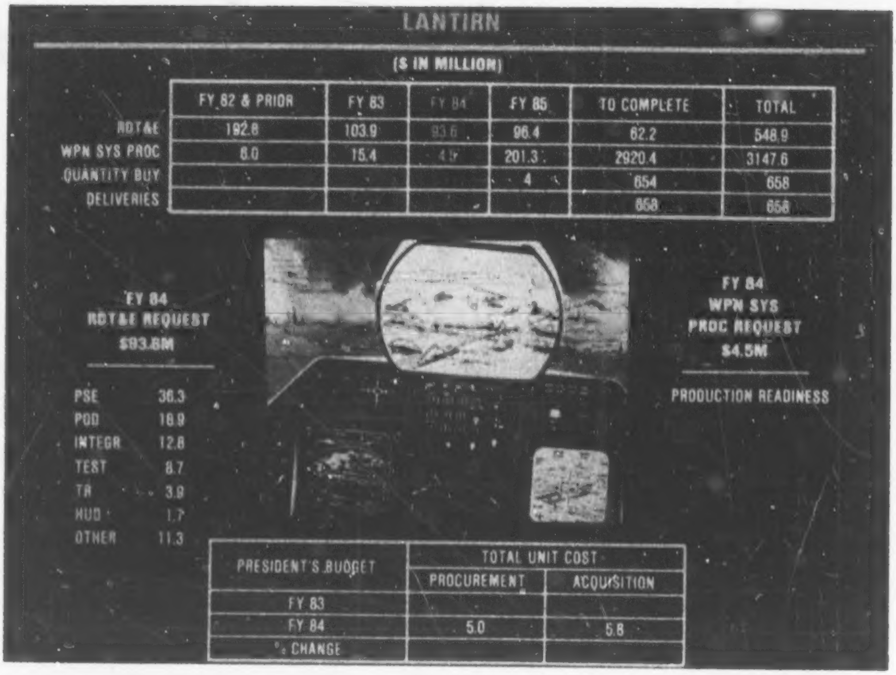
Mr. CARL SMITH. Could you suspend for just a minute until the chairman returns? He asked that we hold this particular briefing for him.

Senator GOLDWATER. Proceed.

General GORTON. The next program, Mr. Chairman, is the Lantirn program which represents the system that we have been focused in on to achieve our needed night capability.

Senator GOLDWATER. General Skantze, 2 years ago we were told the total cost of the Lantirn program would be $0.8 billion. Last year we were advised that the cost had gone to $1.8 billion.

What is the current estimate for the total program cost?



LANTIRN

($ IN MILLION)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
RDT&E	192.8	103.9	93.6	96.4	62.2	548.9
WPN SYS PROC	8.0	15.4	4.5	201.3	2920.4	3147.6
QUANTITY BUY				4	654	658
DELIVERIES					658	658

FY 84
RDT&E REQUEST
$93.6M

PSE	36.3
POD	16.9
INTEGR	12.8
TEST	8.7
TR	3.9
HUD	1.7
OTHER	11.3

FY 84
WPN SYS
PROC REQUEST
$4.5M

PRODUCTION READINESS

PRESIDENT'S BUDGET	TOTAL UNIT COST	
	PROCUREMENT	ACQUISITION
FY 83		
FY 84	5.0	5.8
% CHANGE		

General MARSHALL. The current total that we are projecting for both research and development that is in the 1984 President's budget is $3.8 billion.

Senator GOLDWATER. 3.8?

General MARSHALL. 3.8. Now the big difference, sir, was between the 1983 President's budget and the 1984 President's budget. We changed the number of pods that we were going to buy from 300 to 720.

Senator GOLDWATER. That is reflected in your total cost?

General MARSHALL. Yes.

Senator GOLDWATER. Does that include the automatic target recognizer?

General MARSHALL. No, sir, it does not. At the present time the ATR is not in our baseline program.

Senator GOLDWATER. What will that add to it?

General MARSHALL. If you wanted to buy and put that on all the airplanes, it is $33 million for a sunk cost for the R&D. I will have to get you the additional——

General SKANTZE. While you are looking that up. Mr. Chairman, one of the reasons it is hard to price the ATR at this point is that we were directed, and I think properly so, to put it in advanced development last year, which we did. Attempting to try it in production, we are talking about something that wouldn't be delivered until 1989, the piece that is the ATR.

The technology, the size of the chips that they are going to use to make that are three microns which is very close to what the very high-speed integrated circuit chips will be. In trying to price that the uncertainty was so high as to what the production yield would come out to be that we didn't have very much confidence in the numbers.

So we can give you a number which is additive to that, but at this point in time, because it is an advanced technology item, we really don't have a solid basis on what they are going to cost because we can't speculate on the production yield.

Senator **Goldwater**. As you know, you don't have to sell me on the value of this system. What you have to sell me on is can we afford it? I remember being with you last year at Wright-Patterson.

Anyone who flies a simulator comes away impressed. But this thing is going over the moon.

General **Skantze**. Let me recapitulate a few things. One is that the development program when we restructured it in 1981 we put a cap on that contract. The contractor agreed to do his development program for $298 million. He has not deviated from that. He has met the schedule and he has met the commitments, and the first production pod was just delivered to us.

The F-16 will start flying this summer with both the navigation pod and the targeting pod. So, this summer we are going into that development program.

The estimate that we have had associated with the automatic target recognizer and how you would price it turned out to be a Government estimate. It is not the contractor. The contractor has not failed to meet his commitments.

Our people, in looking at the independent cost analysis, determined that they had made a misjudgment in how you priced certain parts of the system and had come up short.

So, that repricing process was on the Air Force side and not induced by anything that the contractor did.

So, we restructured our own estimate and came up with an increase in the cost. Since there was so much uncertainty as to what the target recognizer would cost, people were trying to speculate on how you would produce these very small size chips with no data base on which to do it and the money wouldn't be required until 1987, we just elected not to include that. At the same time we put a cap on the program which is the $3.98 billion which, in our judgment, is now capped in the same way that the B-1 program is capped, the B-1B. Frankly, we wrestled with this in the air staff and with the Chief and the Secretary and with General Creech and we went back and studied all the possible alternatives and did a very exhaustive look at whether this was worth the price to us.

The answer that came out was that it is worth the price to us because it gives us more leverage in being mission effective in that night environment than anything else we could come up with.

Senator **Goldwater**. To get this down to the perspective we are going to have to get it down to, what I am thinking is around $6 million a copy.

Am I high or low?

General **Skantze**. I think we are about 5.8 for a pod set of two pods.

Senator **Goldwater**. For each airplane?

General **Skantze**. For each airplane?

Senator **Goldwater**. You know that is quite a lot of money.

General SKANTZE. It is not inconsistent with what is one the Apache helicopter, their night system.

Senator GOLDWATER. What are they paying for that?

General MARSHALL. We have done some research into that because of this very concern. Of course, the Lantirn has two pods, the navigation pod and a targeting pod.

What I have done in my coming explanation is put everything in flyaway cost, that is just the pod, no support equipment or R&D or any of the rest, and expressed in 1983 dollars.

Now, the navigation pod for Lantirn in 1983 dollars under those conditions is $1.3 million a set. The targeting pod which is what we keep comparing with other systems, is $1.6 million per set.

Now, the F-18 Flir pod under those same conditions is just about identically the same price as the Lantirn targeting pod, about $1.6 million per F-18 targeting pod. The TAD system that Martin builds for the Army H-60 helicopter, pilot night vision system, that is $1.8 million per set.

The Tram that is on the A-6 costs about $2 million per set. So, Lantirn is in the ball park of all of those other systems.

Senator GOLDWATER. Except that it costs $6 million.

General MARSHALL. Again, if you take all support equipment, R&D cost. If you just take the total procurement cost and divide it by the number of pod sets——

Senator GOLDWATER. That is what we have to do?

General MARSHALL. Yes, sir. I don't have a comparable number for any of these others. I don't have the assumptions that would go with them, how many they will buy, and so forth.

Senator GOLDWATER. Now this has no night capability, has it?

General MARSHALL. Lantirn?

Senator GOLDWATER. Yes.

General MARSHALL. Yes, sir. The navigation pod——

Senator GOLDWATER. I didn't think we had developed the night pod.

General MARSHALL. No, sir. It is a total night system. It is a total night system. The navigation pod includes radar for low level terrain following and a Flir that gives the display on the HUD.

Senator GOLDWATER. What percentage of the time in a Warsaw Pact battle concept would we be flying in instrument weather?

General GORTON. That will vary. We have figures that show that about 13 percent of the time will be in the wintertime environment. We will be down on our toes, so to speak, low ceiling. The Lantirn system is designed to work below, to provide capability for night under the weather attack and we believe a high percentage of the time we will be able to operate with 1,000 feet or lower ceiling, both for navigation and attack.

Senator GOLDWATER. Let us get back to the cost. What is the Air Force's independent cost estimate?

General SKANTZE. I am trying to remember. It came out to be about $4.2 or $4.3 billion.

Senator GOLDWATER. We have 4.8.

General MARSHALL. That includes R&D. Yes, sir, everything took it up within that range. However, sir, that is when the Air Force decided to put a cap on the program. We put a cap on the procurement program and agreed that we would buy less than the full 720 pods if that is what it took to do it.

Now, we looked at ways for how many pods could we get and still live within that cap. If you kept the program stretched out the way we now have it over many years, maximum production rate of about 12 a month, that brought us all the way down to 658 pods.

Now, by compressing the procurement schedule and bringing the procurement rate up to 16 a month we can get that buy under that cap back up to 710 pods. Now, it takes additional money in the 1986, 1987, 1988 timeframe in our budget and we are wrestling with that in our POM deliberations right now. But we can still live with that 3.9 procurement cap and get 710 pods if we do it correctly.

Senator GOLDWATER. Did your original estimate include the automatic target designator?

General MARSHALL. Yes, sir.

Senator GOLDWATER. Last year you will recall that this committee insisted that we have competition in the production of the targeting pod. Has the Air Force structured such a competition?

General SKANTZE. Yes, Mr. Chairman. The Secretary sent over a letter last fall and said that we would structure to compete the targeting pod. He pointed out that it would be not proper for the Air Force to do that, ourselves, in the sense that we had our source selection, had picked the contractor, the winner.

If we turned around and said, you know, we are not going to reopen this whole issue and go back and compete again, it was determined that that would not be an appropriate thing to do.

But if the Navy were funded and came up with an improvement program on their F-18 Flir pod that we could use this as a basis for competition. That is the way we had planned to proceed.

As you are aware, the appropriation bill, CRA bill, contained language that said do not use Lantirn funds for competition.

Subsequent to that I have formally asked the Navy if they would get an updated proposal from the other contractor, Ford Aero, to offer that as a competitive choice. I have had recent correspondence back from the Commander of Naval Air Systems Command which said that the Navy was not funded to do that, did not have a requirement, and therefore was unable to respond to us and had directed the contractor to deal with us directly.

Now, that sort of puts us back in a position where we would be forced to reopen the competition, presumably if we can get funding to support that, say, in the 1984 budget.

The other contractor is due in this week and I am going to talk to him and try to understand his views. At the moment we are in a difficult position to comply and even given that we did get some funding in 1984 to be able to follow through and respond to that, we would probably still be another 2 years away from seeing a competitive pod.

Senator GOLDWATER. General, I can tell you that you have to have competition. I am speaking as one member of this subcommittee, but I think I reflect others. If we continue to buy this without competition, this will go down. It is that simple.

I know the manufacturer, we have talked about it.

I don't know how we are going to be able to authorize a continuance of this program without competition. I don't think you are going to be able to put a cap at 3.9. As you know, I am not inclined against this program, I am inclined for it, but the cost has gotten way, way out of bounds. We could have bought a squadron of P-51's for what we are paying for one set of pods for one airplane.

One more question and I will be through because it is a technical one.

Would it be reasonable to believe that we will be able to employ the Lantirn with Maverick missiles on a single piloted aircraft at night, low level?

General SKANTZE. Yes. More recently we have had, as you may be aware, a two-seat A-10 out at Edwards doing a single-seat night evaluation. They have flown with a Flir which you could also put on the head-up display. In fact, I have been out there and flown it in the back seat.

The conclusion is that yes, you can do that mission single seat. The Lantirn system has enough automatic features and a much wider field of view to where the people who did the evaluation think that the mission can be done.

Bill, you might want to supplement this.

General GORTON. Like General Skantze I have also had the opportunity to fly that aircraft. I am very impressed with the capability. Operating at 200 feet with an A-10 the speed is a little bit slower, but being able to acquire the target using the Maverick readout in the cockpit and presenting it up in the HUD. It is not an easy mission. It is one that we have to train for.

But the Flir capability, automatic terrain following capability, and automatic target speak for itself.

In that A-10 it is very useful and can be used with a single seat.

Senator GOLDWATER. The A-10 is hairy, let us admit it, the guy in the back seat trying to help the guy in the front seat adjust the radar. It is not a pleasant experience.

What are you going to do with the fellow coming in at 450 knots with an F-16 all by himself?

General GORTON. The Tactical Air Command is going to undertake some studies, actually flights to look at that problem. We believe it is feasible, but the user is the man who is going to speak on that and what happens obviously at 400 or 500 or 600 knots will depend on the quality of the system that is presenting the data to the pilot.

In case of the system we now have on the A-10 this would not be the Lantirn proposal. The Lantirn is a far more capable system with wider field of view scans.

We will be flying F-16's this year with the navigation pod, with the targeting pod with the wide field of view. We certainly will be able to answer those questions.

Senator GOLDWATER. By the way, that is the same picture you have out at Wright-Patterson. I missed the target.

You go ahead.

Senator BINGAMAN. Let me ask a couple questions.

Do I understand that you expect this Lantirn system to work well even in bad weather, in rain, snow, fog, those types of situations?

General **Skantze**. No; it is at night or under the weather. A Flir will not work in truly all-weather conditions.

Senator **Bingaman**. It would not work during rain?

General **Skantze**. Heavy rain, no.

Senator **Bingaman**. Or snow?

General **Skantze**. No, heavy snow.

Senator **Bingaman**. Or fog? Does fog knock it out also?

General **Skantze**. Deep fog does.

General **Marshall**. Light fog you can still see.

Senator **Bingaman**. The paper that Senator Hart put together said current infrared testing demonstrates that Lantirn did not find or distinguish useful tactical targets under combat conditions.

General **Skantze**. I would disagree with that. I think the A-10 testing out at Edwards which has a less comparable Flir has indicated clearly you can find targets.

Senator **Bingaman**. In response to the chairman's question about the cost I think you indicated that substantial increase in cost was the result of increasing the number of systems that you were ordering from 300 to 720.

Do you have a figure for us as to the cost of the 300, what has happened to that in the last year?

General **Marshall**. I have a very rough estimate, but we have been concerned that we have not really had time to work that and work the contract conditions and assumptions that would go with that. But it would be about $2.3 billion for 300.

Senator **Bingaman**. $2.3 billion?

General **Marshall**. Yes.

Senator **Bingaman**. Was the chairman's figure right when he said $1.8 billion before?

General **Marshall**. Yes, sir. 1.8 versus about 2.3.

Senator **Bingaman**. That is without increasing the number of systems at all?

General **Marshall**. That is correct. I am concerned that that 2.3 number is very rough. The price has gone up, yes, sir.

Senator **Bingaman**. What explains that increase?

General **Marshall**. Several things. No. 1, support equipment. No. 2, we have pushed the program——

Senator **Bingaman**. You mean we have additional support equipment that we didn't have before or the price of support equipment has gone up?

General **Marshall**. It is a better definition that the price has gone up. The biggest impact is pushing the program to the right. As General Skantze said, initially we had a highly concurrent program and we were looking at a 1986 IOC. We are now looking at a 1988 IOC. So just pushing things 2 years to the right is a significant increase in cost.

General **Skantze**. I think in all candor, Senator, this was an example of a program that was started as an idea that you could move extremely fast without going through a very detailed validation phase and it got off to a bad start.

The reason that we restructured the program was that there was no realistic way we could have done it on the original schedule advertised.

Senator **Bingaman**. I guess my concern, and I think it is the same one that the chairman was expressing, is that we are making things so advanced technologically that we are not going to be able to use them. This is one of the obvious criticisms that you hear a lot of.

It seems to me that we have an extremely complex system here that is costing an awful lot of money. I don't know if it will be useful or not.

General **Marshall**. I would certainly think in this next year when we fly it, we will find out. I fundamentally believe it will. I think the reasons we have had problems with this program is that it was sort of pulled out of the air and the number was thrown out and said, "Gee, we can do this very quickly," and it turned out we really couldn't.

So, we had to stop and restructure the program and stretch it out. That essentially drove the cost increase.

Senator **Goldwater**. I might say that there is no question that if it works, I don't think an aircraft should go into combat without it, even though the price is extremely high.

I think it would be extremely valuable no matter where we went into combat. But I don't think we are even ready yet to be able to answer that question.

You can do a lot with a simulator that you can't do with some guy shooting at you.

General Gorton mentioned the value of low altitude navigation at night and the effect on the Warsaw Pact defenses. Does this mean that the Lantirn navigation pod is much more important than the targeting pod with automatic recognizer?

General **Gorton**. The navigation pod allows you, Mr. Chairman, to get to the target area at low altitude and at night. Once you are in the targeting area you need the targeting pod to acquire lock-on and actually attack the target. No question they both independently provide a capability. It is the synergistic effect of getting both together in the two pods that allows you to get a night attack capability.

Senator **Goldwater**. You need two pods?

General **Gorton**. You need one pod for navigation and the other for attack, yes, sir.

Senator **Goldwater**. You can't live with one pod in combat?

General **Gorton**. That is basically correct. It is a combined system. For instance, if I took just the targeting pod, I would have to proceed at very high altitude and expose myself to the threat or conversely if I just took the navigation pod, I would be able to get into the target area, but not acquire the target.

Senator **Goldwater**. I understand.

General **Marshall**. May I amplify that a little bit? The problem we keep getting into with Lantirn is that it is really two systems. The navigation pod on the Lantirn for the A-10 and the F-16 does those things that are internal to airplanes like the A-7.

The terrain following radar is internal to the A-7. It is internal to the F-18. So they don't need the navigation pod. They have other means of getting to the target. But then they need a targeting pod which is almost identical in capability and identical in price to ours.

Senator **Goldwater**. I realize that.

We are going to do something unusual today. We are going to knock off now because you guys are almost through. We have you tomorrow morning again. I want you to go back and tell General Gabriel he had better have competition on this or it isn't going no place. Is that clear?

General **Skantze**. I promise to come over and talk to the staff now that I have an expression from the Navy.

Senator **Goldwater**. If you want to stay and talk to them, it is all right because I have work I have to get to.

I want to thank you for coming and thank you for your comments. You have made a very good presentation. We hope it will be reflected in the quality of work we can do.

Thank you.

General **Skantze**. Thank you, Mr. Chairman.

[The questions submitted for the hearing record follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN WARNER

AF/GE CONTRACT

Senator **Warner**. This committee has repeatedly stated that any development of a future fighter engine must be conducted on a competitive basis, and that we would not be inclined to authorize funds for full scale engineering development of an alternative fighter engine unless this competition was full and fair. In fact, last year's committee report on the DoD Authorization Bill stated that ". . . this competition (to determine which engine will power the F-16E or F-15E) will be based solely on durability, reliability, operability, and maintainability." Is it correct that the Air Force and General Electric have signed an F-110 Fighter Engine Development Contract?

General **Skantze**. Careful attention has been paid to ensuring the competition is as fair and equitable as possible. Detailed reviews of the competitive approach have been conducted at the highest levels of the Air Force and the Department of Defense. As you noted, our objectives are enhanced durability, reliability, operability, and maintainability. As authorized and appropriated by Congress in fiscal year 1983, the funds for the full scale development of the General Electric F110 were placed on contract in January 1983. One of the underlying purposes of this contractual effort is to provide an engine that would be competitive. At the same time, the Air Force is continuing to fund Pratt and Whitney for development of the improved life core, gear-type main fuel pump, and Digital Electronic Engine Control (DEEC) for the F100. Thus, the engine competition will be conducted with the two engines developed to the same competitive condition. It should be noted that the competition is to satisfy the Air Force's requirements for engines for all of the F-15's and F-16's not just for the F-15E or F-16E.

ENGINE DESIGN SPECIFICATIONS

Senator **Warner**. As part of that contract, the Air Force and GE agreed to specific F110 engine design specifications. Are these engine specifications for the F110 comparable in severity to those used for the current F100 design specifications? If they are less severe, could you comment on how this will affect the advertised durability of the F110 engine?

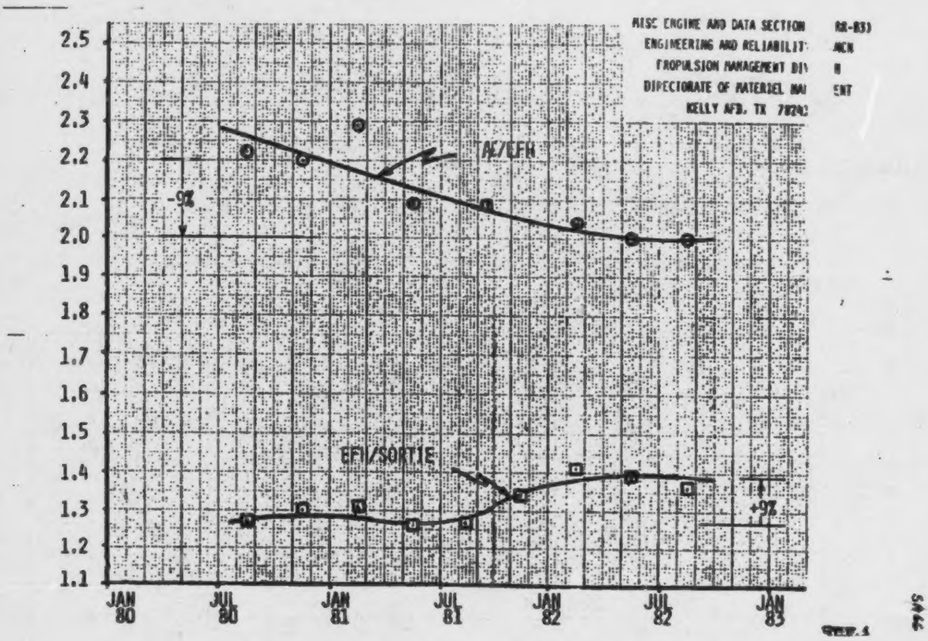
General **Skantze**. We use the Accelerated Mission Test (AMT) as a basis for the qualification of Air Force engines, and the AMT is periodically updated to reflect actual usage of these engines. In 1979, both the F100 and the F110 used AMT IV, to establish design criteria reflecting our best judgment at that time of how the engine would actually accrue wear in operational usage. In mid-1982, we updated our data base and redefined the AMT to reflect the latest usage, AMT VII. The F100 improved life core, not the entire engine, had the advantage of being designed to the more current AMT VII to which it will be tested.

It is worth noting that 4000 cycles to either AMT IV or AMT VII is over twice the durability of today's F100. 4000 TAC cycles of either AMT provide the same cumulative stress levels. Other parameters are somewhat more severe to accurately reflect the latest actual engine usage. In any event, both engines, the improved F100 and the F110, will be evaluated and tested against the AMT VII mission spectrum. We expect both engines to meet out durability requirements as reflected in AMT VII.

TREND LINES

Senator **Warner**. I understand the Air Force, under contract, has accumulated data from three operational bases—Nellis, MacDill, and Hill AFBs in an attempt to define today's mission utilization of the F100 engine in both the F-16 and F-15 aircraft. Could you supply this committee the "trend lines" established by the data for "missions cycles (Type I, III and IV)" and "engine hot time," and how the current F100 and F100 design criteria compare with these trends?

General **Skantze**. The data from Hill, MacDill, and Nellis indicate that the 2.2 TAC cycles per engine flight hour (TAC's/EFH) experienced in 1979 and 1980 time period has decreased to 2.0 TAC's/EFH in the 1982 time period. The high Mach number usage has changed since the initial engine definition. The engine cycle content and time at maximum temperature have also changed and are incorporated in the common Accelerated Mission Test (AMT) requirements for both the F100 and F110 engines. The AMT severity versus the average mission usage is show on the attached charts.

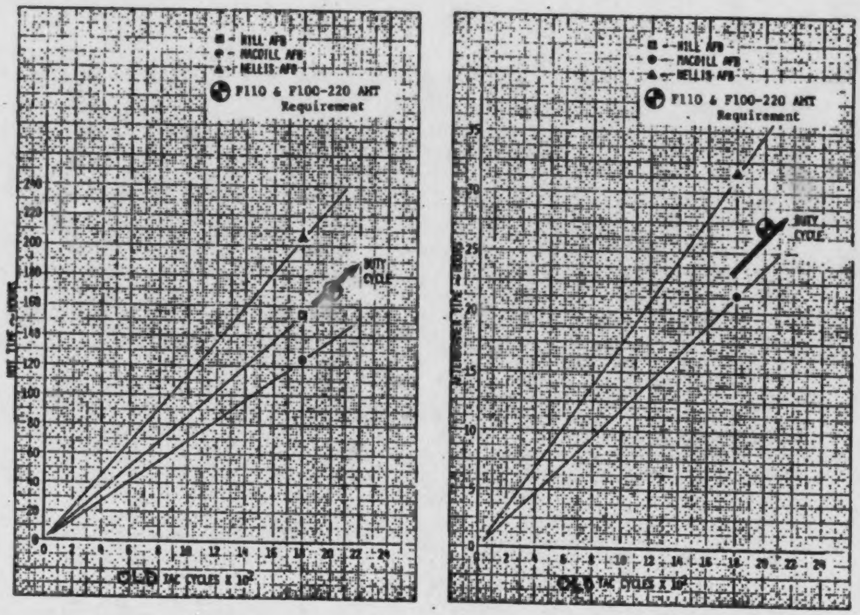


ENGINE USAGE CHANGES WITH TIME...

SORTIE LENGTH HAS BEEN INCREASING

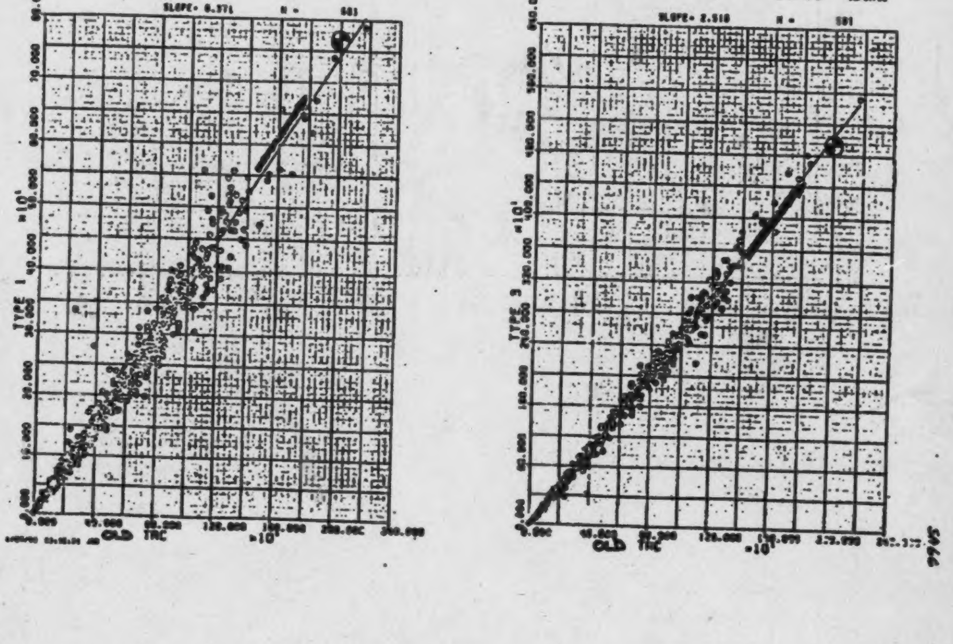
ILC DUTY CYCLE

HOT TIME AND AFTERBURNER TIME CONFIRMED BY SERVICE LIFE MONITOR DATA

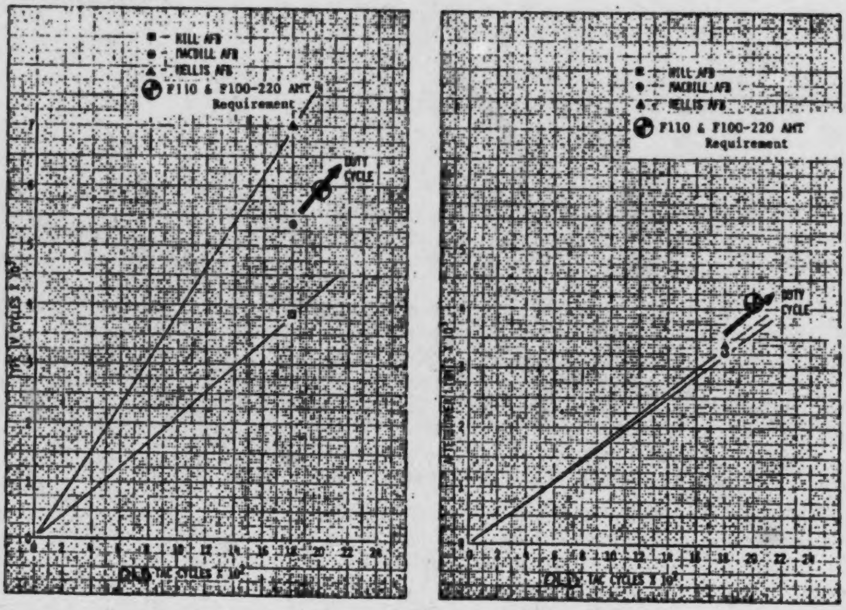


. ILC DUTY CYCLE

TYPE I (OFF/MIL +/OFF) AND TYPE 3 (IDLE/MIL +/IDLE) CYCLES MATCH EHR DATA



- ILC DUTY CYCLE
- TYPE IV (CRUISE/MIL+/CRUISE) CYCLES AND AFTERBURNER LIGHTS CONFIRMED BY SERVICE LIFE MONITOR DATA



ESTIMATE OF F100 DURABILITY

Senator **Warner**. I understand that the F100 design specifications fall short in several areas from field conditions established by this analysis. Would you provide an estimate of F100 durability if it were required to perform at the higher specifications?

General **Skantze**. The answer addresses the question in terms of the F110 engine which is assumed to be the engine in question, not the F100. The F110 specification requirements are presented recognizing that the engine was designed to satisfy the mission usage that existed in the 1978 time period. As such, the basic design is required to meet the pre-1980 operation as a minimum. However, with a 1982 update, indicating a usage different from that employed during the original design, a reassessment to the revised operation has been incorporated as a specification requirement. In addition, any design changes or redesigns pursued during FSD will be required to meet the current usage.

Finally, the actual qualification testing (Accelerated Mission Test (AMT)) will be conducted to the profiles representative of current operation. Thus, a quantitative assessment of both contractor's hot section durability will be established from running an identical 400 TAC cycle AMT, with the demonstration hot section life in excess of 5000 TAC cycles to the pre-1980 operation, the F100 durability to the current usage is expected to meet or exceed the specified requirements (4000 TAC cycles to updated profiles)?

TWO LIMITS OF F100 ENGINE

Senator **Warner**. I have been told that two limits of the F100 engine specifications, compressor exit temperature and fuel inlet temperature may make use of the F100 in the F-15 aircraft questionable without changing the advertised durability of the engine or without major engine or aircraft modifications. Does the 1140 degree compressor exit temperature limit, limit an F110 powered aircraft (F-15) to flight envelope not to exceed 2.0 Mach, while the F-15 flight envelope calls for capabilities to 2.5 Mach? If the F110 compressor exit temperature limit is a durability limit, what effect in the engine life and durability would exceeding this limit have on the F100?

General **Skantze**. The answer provided assumes the question relates to the F110 specification as this appears to be the issue. A phrase in the F110 specification incorrectly read "time at 1140°F" instead of "time above 1140°F". This may have led some to conclude, incorrectly, that a high Mach limit exists. Both the improved F100 and the F110 will have 200°F hot fuel temperature limits. Our analysis shows no problems in meeting F-15 SAR performance thresholds with the F110.

FUEL INLET TEMPERATURE

Senator **Warner**. The F110 design specifications define a fuel inlet temperature limit of 110 degree F steady state with transients to 170 degree F. Can the current F-15 provide fuel to the engine at the steady state limit? If not, what would be required to meet those temperature restrictions? How does the F100 engine compare in specification?

General **Skantze**. Although the fuel inlet temperature chart selected for use in the F110 specification was an F-16 chart with a maximum of 170°F as shown on the chart, the text of the specification required a continuous 200°F capability as is the case for the F100 engine. In order to preclude any misunderstandings, we are updating the F110 specification to include an F-15 chart which has the 200°F on the chart as well as in the text.

COMPARISONS OF ENGINE SPECIFICATIONS

Senator **Warner**. I am concerned that these differences in engine specifications may be significant, especially for engines competing for placement in both the F-16 and F-15 aircraft. I would like you to provide this committee with a complete comparison of engine specifications for the F110 and F100 engine, how they relate to anticipated field use, actual flight envelopes, and if, if any, degradation in aircraft performance or engine life will result if both engines are required to meet actual field established conditions?

General **Skantze**. Both engine specifications will contain the same basic requirements relative to engine operability, compatibility, and durability. Recognizing that fundamental differences exist in the two engine designs, an identical specification is not practical. However, the durability assessment (analysis) and qualification testing [Accelerated Mission Test (AMT)] is being standardized for both engines and will reflect current operational experience. In addition, the initial performance levels and deterioration characteristics will insure compliance with the weapon systems requirements. The Air Force will verify that these performance requirements are met through the use of engine contractor supplied performance status decks and aircraft performance analyses. The planned endurance testing and analysis will serve to demonstrate the ability of both contractors to meet the same durability requirements. No degradation in aircraft performance or engine life is anticipated in meeting the requirements consistent with current operational experience.

UNITED STATES AIR FORCE

FY 1984 BUDGET ESTIMATES

- Aircraft Procurement
- Missile Procurement
- Research, Development, Test & Evaluation

Statement of

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PRESENTED TO THE 98th CONGRESS | 1983

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I. INTRODUCTION

Mr. Chairman and Members of the Committee:

It is a pleasure to present the Air Force Aircraft Procurement, Missile Procurement, and Research, Development, Test and Evaluation (RDT&E) budget request for Fiscal Year 1984.

I welcome the opportunity to work with the Congress to strengthen our national defense. During the past year, the Soviets have continued to increase and modernize their conventional and nuclear forces. This steadfast growth in military capability threatens our national security and worldwide interests and challenges the peace and freedom we and our allies enjoy. In order to preserve our security and protect our interests, we must work together to balance the needs of defense with our other national requirements.

I have personally reviewed the programs contained in this budget request. Both in the short and in the long term, these programs represent a balanced and affordable approach to counter the ever-growing Soviet military buildup. I firmly believe that the American people and the Congress see the need to modernize and improve our forces and present to the Soviets a capable and credible deterrent. This deterrent is necessary if we are to protect our national welfare and improve international stability.

Over the past two decades, the Soviets and their allies have amassed a significant nuclear and conventional force capability, large enough to directly threaten our survival as a nation. This quantitative and qualitative buildup of forces is directed by the Soviet leadership who has made military superiority the Soviets' number one national priority, to the detriment of the health and welfare of their citizens. The Soviets have demonstrated that when they have the military advantage and the risk is not too great, they will resort to the threat or actual use of force to achieve political objectives.

If we stand still and allow the Soviets to continue their buildup, their military advantage will increase. We have no recourse but to strengthen our military defense and maintain a deterrent capability.

Military resources are directly related to financial investment. In spite of severe economic problems, the Soviets continue to outspend, outman and outproduce us in military terms. Since 1972, the Soviet Union has outspent the United States in every category of military investment. As a result, the Soviet Union has overcome many of the military advantages previously possessed by the United States.

From 1972 through 1981, cumulative Soviet military investment (procurement, RDT&E, and military construction) has outpaced U.S. military investment by some $470 billion (1984 dollars). This difference in expenditures is magnified by the fact that Soviet/Warsaw Pact investments are more efficient than the separate allied investments.

While the Soviets centrally design and produce almost all Warsaw Pact military equipment, the United States and its allies have predominantly separate defense industries with different designs and separate production. Thus, inefficiencies result from nonstandard multiple designs, as well as smaller production runs. As a result, weapon system unit costs tend to be higher. Even though the United States and its allies spend more for defense each year, weapon system unit costs escalate, fewer and fewer systems are produced and defense security is lessened. To correct this alarming phenomena, we are pursuing more collective, multinational defense industrialization.

Not only are the Soviets outspending and outproducing us in almost every category of military equipment, they are also fielding systems of increasing quality and sophistication. In Soviet air power, we are seeing fighter aircraft with increased payload and range, with improved avionics, armaments, electronic countermeasures and night, all-weather capabilities. These advances enhance their offensive capability, and erode our qualitative superiority. By acquiring Western technology over the years, the Soviets have been able to make substantial technological gains in a relatively short time, especially in the areas of electronics, propulsion, weaponry, command, control and communications (C^3), and space applications.

This Soviet military buildup has caused a worrisome perception of reduced U.S. power in today's world. Historically, our qualitative superiority has been our advantage. Now, that qualitative gap is closing rapidly. We cannot let the Soviets, our allies or any other nation perceive us as weak or indecisive. We must sustain the commitment we made last year to a stronger defense and maintain the national resolve to counter the Soviet challenge.

We are moving in the right direction to rebuild our war fighting capability. Our Air Force budget priorities remain consistent: Our PEOPLE are the key to improving our combat capability; we depend on their high quality, professionalism and dedication to give us the combat edge. We will continue with the President's plan to MODERNIZE OUR STRATEGIC FORCES which had a strong start last year with continued Congressional support for the B-1B bomber, and our strategic C^3 improvement efforts. We have made substantial progress in the last two years toward correcting the shortfalls in operations, maintenance and spare parts and improving the READINESS AND SUSTAINABILITY of our combat forces. We have continued our initiatives to EXPAND OUR AIRLIFT CAPABILITY by upgrading existing C-141 and C-5 aircraft, procuring KC-10 and C-5B aircraft, pursuing our Civil Reserve Air Fleet (CRAF) enhancement program, and developing the C-17. OUR TACTICAL FORCE MODERNIZATION efforts will continue to emphasize stable production rates for the F-15 and F-16, while making evolutionary improvements to our air-to-surface, night and all-weather combat capabilities.

In the field of space, we have established the Space Command to consolidate and better manage our operational space systems. In conjunction with this command, we have also established the Space Technology Center to concentrate applicable research and development efforts on space systems and improve our technologies and capabilities in this area as well. Because of the Soviet drive to exploit space for military advantage with deployments such as their operational antisatellite system, we are investing in technology advancements to protect our space systems and access to space, and to ensure our space systems can survive and operate in a hostile wartime environment.

We can indeed restore the strength and credibility of our strategic and conventional forces by taking advantage of this nation's technological and industrial genius. We cannot afford to let critical technological advantages slip away, or be stolen by the Soviet Union. Our technology must be protected as a national treasure.

We must maintain technological leads in such fields as space, communications, and information processing. Only the most modern weapons and delivery systems, in conjunction with early warning systems, defensive weapons and survivable command and control, can guarantee deterrence. These are areas where we are specializing and investing.

Our success in meeting the total Soviet challenge will, to a great extent, depend upon our continuing national commitment to maintain a stronger defense. The Air Force's RDT&E and Procurement programs are vital elements within the overall defense program. Through these programs, we will develop and procure the systems needed to redress the growing military imbalance and reverse the erosion of our technological lead. We are beginning to make progress. Over the past few years, we have had real growth in RDT&E and procurement funding, and the Fiscal Year 1984 request is another strong step forward toward meeting the Soviet challenge.

However, increased funding alone is not sufficient to meet the challenge. I want to make it clear that some very difficult decisions are represented in the Fiscal Year 1984 budget request. We have selected carefully from among the programs competing for RDT&E and Procurement funds and are requesting funds for only those programs that promise significant benefits.

In RDT&E, we will not pursue technology for technology's sake. Rather, we have focused on the threat, and are using our technology to satisfy critical needs in the most affordable, supportable, and effective ways.

In procurement, we have balanced the important production of aircraft and missile systems with continued emphasis on spares, repair parts and other logistics requirements to improve our operational readiness and sustainability. Our modernization program is based on having capable and affordable forces equipped to adapt to an array of threat environments and political situations.

Overall, we have taken some important new initiatives to strengthen our program management, improve our production efficiency and restore our industrial base. We are controlling costs better and making more effective use of available resources. We are also continuing our cooperation with the North Atlantic Treaty Organization (NATO) and other allies to collectively maximize the return on our investment for defense.

In summary, we have made a good start toward meeting the Soviet challenge and restoring America's credibility. We must continue with our modernization efforts in Fiscal Year 1984 to achieve success.

In presenting the Fiscal Year 1984 request, my discussion centers on the major mission areas, along with readiness and sustainability and management initiatives. For each mission area, I will briefly describe the current and projected threat, our deficiencies in meeting that threat, and then highlight the key programs which are needed to improve our capabilities. Intelligence and classified programs are not addressed, but will be reviewed in separate closed hearings.

Under readiness and sustainability, I will discuss those programs that provide overall support and attribute their costs to several different mission areas. Included are our simulator programs, spares and repair parts, common ground equipment, and war consumables. These are not the only programs that affect readiness and sustainability, but they are key programs in the Aircraft and Missile Procurement appropriations and merit separate discussion.

At the end of this statement, there are tables of the Fiscal Year 1984 Procurement program and a complete list of RDT&E programs by mission area. Also included is a glossary of acronyms and abbreviations. Detailed information on the individual programs has been provided to the Congress and may be found in the Congressional Data Sheets, the Justification of Estimates for Procurement Programs, and the Descriptive Summaries for RDT&E programs.

II. STRATEGIC

Strategic force modernization is the highest priority effort contained in this budget request. This emphasis is dictated by the need to end the relative decline in our strategic capabilities and to restore a margin of stability and safety in the U.S.-Soviet strategic balance.

The primary objective of our strategic forces is to deter Soviet nuclear aggression and coercion against the United States, its allies, or others whose security is vital to our national interests.

To maintain the credibility of that deterrent, our strategic forces must be clearly seen by the Soviets as able to defeat their military and political goals at any level of conflict they may contemplate. Moreover, our strategic forces must be designed with sufficient survivability so that the Soviet Union will not perceive any advantage in initiating a nuclear attack in a crisis. Our forces must be able to hold at risk a wide range of the enemy's assets, including hardened military and leadership facilities, even after a Soviet first strike. If our strategic forces are clearly able to meet these conditions, then the Soviet Union can have no confidence that an attack by them would meet with success no matter how well conceived or at whatever level of violence.

This deterrent objective is enforced by the strategic Triad concept--a highly credible, capable force structure that is designed to deter and, if necessary, respond to a wide range of threats. The Triad consists of submarine-launched ballistic missiles (SLBMs), land-based intercontinental ballistic missiles (ICBMs), and the bomber leg, which includes cruise missiles and supporting tankers. To effectively maintain deterrence, these forces must be capable of surviving a first strike with a credible counterstrike capability of such magnitude as to deny the Soviets any possibility of a favorable strategic outcome.

The Triad concept supports deterrence in two ways. First, it reduces our risk of being attacked since the Soviets would not be able to neutralize all three legs simultaneously. Second, it forces the Soviets to invest more money in defensive systems, rather than offensive, to counter the land, sea and air threats presented by the Triad. This deterrent capability of the Triad has served us well in the past and will continue to serve us well in the future, but only if we modernize and maintain the strength of each Triad leg.

We need the Triad more today than we have in the past. At the end of World War II, the United States had a monopoly in nuclear weapons. This posture allowed us to rely on our strategic force superiority to help maintain stability in the world.

Regrettably, the Soviet Union, over the last two decades, has engaged in a massive and destabilizing strategic arms buildup that threatens the survivability and retaliatory effectiveness of our current strategic forces. This buildup has allowed the Soviets to field powerful strategic forces and has caused a shift in the strategic balance. Any imbalances in strategic force capabilities provide added incentives for Soviet adventurism and makes meaningful and equitable arms reduction agreements more difficult to achieve. Unless the Soviet momentum is countered through modernization and arms limitations, we face the ominous prospect of substantial Soviet superiority in the years ahead.

This shift in the balance of strategic power resulted from a determined and sustained Soviet commitment in the 1960s to strategic force modernization. Hence, a significant disparity has existed for years between U.S. and Soviet spending for strategic forces. From 1972 through 1981, the estimated cumulative dollar costs of Soviet strategic force procurement exceeded that of the United States by about $140 billion (1984 dollars). We need to continue our own investments to modernize our strategic forces to ensure their deterrent value in the face of this substantial Soviet buildup.

We must proceed quickly and resolutely with President Reagan's broad and coherent plan for revitalizing our strategic forces. Over the next several years the President's program will strengthen our current strategic posture and provide deterrence that is far more secure and stable. Furthermore, the program will increase the incentive for the Soviets to negotiate genuine arms reductions.

The President's program consists of five mutually reinforcing elements: (1) improvements in C^3 systems, (2) modernization of strategic bombers, (3) deployment of new submarines and submarine-launched missiles, (4) a step-by-step plan to improve the strength and accuracy of new land-based missiles and to reduce their vulnerability, and (5) improvements in strategic defense. The Air Force is responsible for carrying out much of the President's strategic program. The balance of this chapter describes the key Air Force land-based ICBM, bomber leg and strategic defense programs. Strategic C^3 systems are discussed in Chapter V.

STRATEGIC OFFENSE

The Air Force is responsible for two legs of the strategic Triad--land-based ICBMs and the bomber leg.

LAND-BASED ICBMs

Land-based ICBMs offer a unique set of strategic characteristics that are essential to deterrence. They are accurate, responsive, enjoy reliable, real-time communications with command authorities, possess a short-time-to-target capability, offer peacetime alert rates approaching 100 percent, and are less expensive than the other two Triad forces to operate and maintain. When combined with the other force elements of the strategic Triad, ICBMs place significant stress on Soviet offensive and defensive capabilities. Offensively, it is difficult for the Soviets to plan and execute a successful attack on all three components. Defensively, it is difficult for them to defend against the Triad's combined and complementary retaliatory effects.

However, over the last two decades the Soviets have developed and deployed several generations of advanced ICBMs with large throw weight and high accuracy that have given them the capability of destroying nearly all of our existing Titan and Minuteman ICBM force in a first strike, while expending a relatively small proportion of their ICBM force in the process.

Of equal importance, they have hardened their ICBM silos and critical command and control facilities to the point that our Minuteman force has only limited capabilities against them. This imbalance in such a critical component of strategic capability seriously undermines the strength of our nuclear deterrent. This is an especially dangerous development in light of Soviet doctrine which, during time of war, places preeminent stress on preemptive destruction of U.S. strategic forces and limitation of damage to the Soviet Union's forces and mainland.

To ensure that a Soviet first strike against our land-based ballistic missiles would not prevent us from retaliating effectively, we must have a missile that is survivable and capable against key Soviet hard targets. The M-X, or Peacekeeper, in a survivable basing mode, will provide those characteristics. Deployment of the Peacekeeper will significantly bolster deterrence, taking away any Soviet incentive or hope of gain through a first strike.

The Peacekeeper is a four-stage ICBM carrying ten independently targetable warheads. It will be twice as accurate as Minuteman III, our current front-line ICBM, carry over three times the number of warheads, and have much greater targeting flexibility. The Peacekeeper possesses a greater resistance to nuclear effects, an advanced guidance system, and the prompt hard target kill capability necessary to let the Soviets know that we can, if necessary, retaliate effectively against the full range of their high value strategic assets, thereby enhancing deterrence. The missile is currently in full scale development with the first test scheduled for 1983.

The Air Force recommended Peacekeeper deployment in new hardened capsules in closely spaced basing (CSB). CSB provides required survivability, can be accomplished at reasonable cost, and can be deployed with minimal land use and environmental impact. One hundred missiles arrayed in the CSB mode would require less than 20 square miles of land. Yet this force of Peacekeeper missiles in CSB would reduce the current strategic instability and bolster deterrence by eroding Soviet confidence in their ability to successfully conduct offensive strategic operations and to implement military solutions to their political aims.

CSB involves placing Peacekeeper missiles in superhard capsules that are spaced approximately 1,800 feet apart. Because of this close spacing, when the first attacking warheads detonate, they will cause atmospheric disturbances of sufficient magnitude to either destroy or alter the intended effect of those warheads that follow. This phenomenon, called fratricide, limits the size and pace of a Soviet attack, and allows a majority of the Peacekeeper missiles to survive.

Fratricide, therefore, puts an upper limit on the size of the force that can be brought to bear against CSB and drastically reduces the utility of the size and large numbers of Soviet warheads that can be used against the Peacekeeper.

Moreover, the Peacekeeper missiles in CSB will allow us to negotiate strategic arms reductions from a position of strength, giving us additional leverage for success. At the same time, the Peacekeeper in CSB will reaffirm our commitment to deter Soviet threats with a stable and highly capable force.

The President supported the Defense Department recommendation on CSB, but the last Congress restricted obligation of funds for full scale development of a basing mode until both Houses of Congress have approved a permanent basing mode. At the same time, the Congress requested that the President submit a report not earlier than March 1, 1983 containing several detailed technical assessments on missile and basing alternatives. To respond to the Congress, the President appointed a Commission on Strategic Forces to review our nation's nuclear deterrence posture and nuclear weapons programs and prepare recommendations.

In Fiscal Year 1984 we will continue development of the Peacekeeper missile with emphasis on preparations for flight testing. The first test flight of the missile is scheduled in 1983 from the Western Test Range at Vandenberg AFB, California. In Fiscal Year 1984, we will procure 27 missiles and, at the same time, vigorously pursue a permanent basing mode to support our objective of deploying the Peacekeeper beginning in 1986.

Although the Peacekeeper commands primary attention in our ICBM modernization, important programs are also under way to improve the effectiveness and endurance of our existing Minuteman force. In the ICBM C^3 program, we are integrating three improved communications systems into the Minuteman launch control centers to increase reliability of emergency message reception and enhance connectivity with higher authority and other strategic forces. We are also revising the guidance software to improve Minuteman III accuracy.

Modification programs for the Minuteman force include the Minuteman Extended Survivable Power (MESP) program to provide lithium batteries for 200 Minuteman III silos. These batteries will extend Minuteman on-alert time significantly by augmenting existing commercial, stand-by diesel, and lead-acid battery power sources. Other modification projects support reliability and maintainability upgrades.

Titan II, our oldest deployed ICBM, has already exceeded its planned operational life and is becoming more costly and difficult to operate and maintain. As part of the President's strategic modernization program, Titan IIs are being incrementally deactivated between Fiscal Year 1983 and Fiscal Year 1987. The retirement schedule permits a prudent drawdown consistent with safety and logistical constraints, while at the same time satisfying operational alert requirements.

The Advanced Strategic Missile Systems program provides long-term options for maintaining the effectiveness of our future ballistic missile forces by supporting early development of critical elements of advanced reentry systems, missile guidance, support equipment and basing. Our current emphasis is on developing Peacekeeper and Minuteman III defense penetration systems with later work planned for other ICBM subsystems.

THE BOMBER LEG

Historically, the unique military characteristics of the manned bomber have provided a vital dimension of flexibility to our strategic and tactical forces. As reusable strategic weapon systems, long-range combat aircraft can accurately deliver large nuclear or conventional payloads throughout the entire spectrum of conflict.

Bombers are the only element of our strategic Triad that can be launched prior to a decision to employ these weapons. During a crisis, manned bombers can be launched to ensure their survivability or to signal national resolve. As the situation requires, bomber crews can then be redirected or recalled with confidence. Moreover, bombers provide the capability to conduct damage assessment strikes against fixed targets and to engage unanticipated or imprecisely located targets. In addition, through the use of human judgment and on-board sensors, crews can determine target location and status at the time of strike.

The manned bomber also provides a major element in our ability to project a nonnuclear force--either to complement our tactical forces or in response to unforeseen contingencies worldwide. Additionally, bombers are able to provide maritime support to U.S. naval forces through long-range sea surveillance, ship attack, and mine laying.

In light of the rapid advances in the Soviet military arsenal and Soviet-backed adventurism around the world, the need to modernize our strategic bomber force is clear and compelling. The B-52s have been the mainstay of our manned bomber force for the past 25 years, but their ability to continue to serve effectively in the long term is diminishing. First of all, they are becoming more difficult and expensive to maintain. In addition, because B-52s are not fully hardened against the effects of nuclear blasts and are relatively slow in flying out from their bases, they are more vulnerable to attacks from SLBMs launched from Soviet submarines patrolling off our coasts. Moreover, because of their large radar reflectivity and relatively slow speed at low altitudes, the B-52s' capability to penetrate Soviet air defenses will decline substantially during the latter part of this decade.

The limitations inherent in the B-52 make it imperative that we start fielding a follow-on bomber now. We have begun a time-phased bomber modernization program designed to effectively use the existing capabilities of the B-52 while laying the groundwork for our future bomber force. The plan calls for the major portion of the B-52G and B-52H force to be modified to carry cruise missiles. At the same time, we will produce 100 B-1Bs which will have an Initial Operational Capability (IOC) in 1986. The final segment of the plan is to develop and produce an Advanced Technology Bomber (ATB) with an estimated IOC in the early 1990s.

Acquiring the B-1B while continuing to pursue the ATB is the most prudent approach for revitalizing our bomber forces. This approach enables us to field the necessary additional forces required during a period when the United States must depend heavily on bombers, while we take the proper steps to strengthen our land-based missiles. It will also provide time for an orderly and logical development pace of the ATB to capitalize on this important technology and avoid major risks and costly redesigns. In addition, a combined force of B-1Bs, ATBs, and cruise missiles will place maximum stress on Soviet air defenses and provide the United States with significant deterrent capability.

The B-1B is about 80 percent common with the original B-1 in terms of basic airframe and engine design. It will incorporate state-of-the-art improvements that will make it highly survivable against existing and projected threats. For example, the B-1B will embody a combination of techniques to reduce its radar cross section to a level one-tenth that of the original B-1 and one-hundredth that of the B-52. It will also include the latest developments in electronic countermeasures technology and offensive avionics systems. These developments, in conjunction with its speed and low level capabilities, will provide high confidence that the B-1B will be able to penetrate Soviet air defenses well into the 1990s and perform as an effective strategic offensive weapon system.

Because the B-1B will be capable of performing the missions of a conventional bomber, a cruise missile launch platform and a nuclear weapons delivery system in strategic and tactical roles, it is an essential element of the President's Strategic Modernization Program.

The President has certified to the Congress that we can field the B-1B on time and within the projected cost of $20.5 billion (expressed in Fiscal Year 1981 constant dollars, or $28.3 billion, expressed in then year dollars), if the Congress appropriates the money in the amount and on the schedule advanced by the Administration. This confidence stems from the fact that the major part of the engineering is complete, the design is mature and tested, and the B-1 has already undergone almost 2,000 hours of highly successful flight testing. The current program incorporates no new technology development. Our primary focus is on the integration of proven technology and state-of-the-art systems. In addition, critical long-lead items necessary for initial production, such as forgings, tooling, and materials, have been retained from the original B-1 program and are available. Finally, we have in place a highly skilled and experienced team of Air Force and contractor personnel to manage the program.

The Fiscal Year 1984 B-1B RDT&E program continues necessary development and test activities, including work deferred from the original B-1A program, cost/producibility redesigns, development of multirole capabilities, integration of modern off-the-shelf avionics and flight tests. We intend to seek multiyear funding approval for the B-1B beginning in Fiscal Year 1984, with advanced procurement in Fiscal Year 1983, to take advantage of major savings opportunities in the purchase of economic lots of raw materials, parts, subassemblies, etc.

As for the ATB, we have selected the prime contractor as well as other key members of the development team. While most details of this program are classified, the essential point is that the ATB is being developed using low observable techniques to negate the effectiveness of present and projected air defenses. The technologies involved are exciting and promising, but because of the major advances required in several areas and the consequent uncertainties involved, there would be a high degree of program risk in concentrating solely on the ATB. For these reasons and others, a significant acceleration of this important program is not prudent at this time. However, we are confident that our orderly development program will enable us to resolve these uncertainties and will result in an ATB that represents a technological advance of extraordinary military significance. When deployed in the 1990s, it will augment the B-1Bs capabilities and contribute dramatically to the strength and deterrent value of our strategic forces well into the next century.

Until the B-1B is available, the B-52 will remain the mainstay of the bomber leg. As these aircraft transition to the cruise missile carrier role, we expect them to remain effective well into the 1990s. These continuing capabilities will require modifications and updates to counter the expected threat, maintain aircraft effectiveness and reliability, and keep the aircraft supportable. RDT&E activities include avionics updates to B-52Gs and B-52Hs for Air Launched Cruise Missile (ALCM) compatibility; updates to selected critical subsystems, including the radar, to correct reliability and supportability problems; and development of essential electronic countermeasures and nuclear hardness upgrades.

Our B-52 procurement efforts have been largely devoted to obtaining offensive avionics system modification kits for the B-52G and B-52H, as well as modification kits for a cruise missile external carriage capability. In Fiscal Year 1984, we will continue procurement of cruise missile carriage modification kits for the B-52H, while developing the Common Strategic Rotary Launcher (CSRL) for internal carriage.

We are continuing procurement of the ALCM-B, the only major near-term initiative we have to counter the growing expansion of Soviet military capabilities. The ALCM-B enhances our bombers' capabilities by providing greater weapons accuracy, increased flexibility for bomber routing and targeting, reduced bomber exposure to defenses, and increased defense saturation. Our RDT&E activities include development of depot support equipment, engine performance and reliability improvements, and other upgrades to enhance the ALCM-B's effectiveness. Additionally, we are currently evaluating competing designs for an Advanced Cruise Missile(ACM). These designs offer substantial improvements in long term effectiveness. The ultimate force mix of ALCM-B and ACM will depend on the outcome of the ACM source selection and and its overall cost. The Fiscal Year 1984 Procurement funds are for ALCM-B support equipment.

The near-term deployment concept is to carry a mix of ALCMs, Short-Range Attack Missiles (SRAMs), and gravity bombs on those B-52s modified for cruise missile carriage. This will prevent the Soviets from optimizing their defense against the bomber or the cruise missile, and will provide maximum deliverable megatonnage and weapons during the transition period of the B-52 to a standoff, cruise missile carrier role.

In reviewing the internal weapons carriage on current and planned bomber forces, we recognized an opportunity to consolidate several rotary launcher development efforts into one CSRL. In addition to carrying strategic gravity nuclear weapons and cruise missiles, the CSRL will be designed for and be compatible with future conventional weapons such as the Medium Range Air-to-Surface Missile (MRASM) and the Conventional Standoff Weapon (CSW). The CSRL will avoid launcher proliferation and reap the cost, operational, and support benefits associated with a common design.

In order to defend the B-52, FB-111, ALCM, and tactical aircraft against the increasingly lethal and sophisticated Soviet air defenses, we have some very important efforts centering around the Protective Systems program. This program develops and tests improved electronic, infrared and electro-optical countermeasures.

Tanker aircraft are a vital part of our bomber and conentional forces. Our major effort is to modernize the KC-135A by replacing the current engines with CFM56 modern technology engines and upgrading 34 subsystems. We are continuing the wing reskin structural modifications to extend the C-135 service life in line with force structure planning.

Reengining with the CFM56 is the most cost-effective means of alleviating a serious and growing tanker shortfall. A reengined KC-135, designated the KC-135R, is on the average as capable as one and one-half KC-135As and will have a useful life well into the next century. Aside from helping to reduce increasing tanker shortfalls, the KC-135R will also correct specific KC-135A operational and environmental deficiencies. With its performance improvements, the KC-135R will off-load more fuel and provide increased operational flexibility by eliminating our current dependence on extremely long runways.

In addition, the new engines will offset the high and growing costs of operating and maintaining the present aging engines. Because of fuel efficiency alone, we estimate that a fleet of KC-135Rs would save approximately 110 million gallons of fuel per year--a five year savings of over $715 million. Finally, the CFM56 will meet Federal Aviation Administration noise and pollution standards which the current J57 engines do not meet.

In Fiscal Year 1984, we plan to buy a total of 31 kits for KC-135R aircraft; through Fiscal Year 1988, we plan to buy approximately 334 kits. Joining our KC-135R modernization effort, the French government will reengine its eleven C-135F aircraft, as part of the production program.

STRATEGIC DEFENSE

Strategic defense is an integral part of our deterrence posture. Our strategic defense forces ensure that our strategic retaliatory capability survives a Soviet first strike by providing timely, reliable, and unambiguous warning, assessment and defense. Our atmospheric warning and defense systems are required to defend against bomber and cruise missile strikes, our missile surveillance and warning systems are required to provide warning and limited assessment of missile attacks, and our space surveillance and defense systems are required to provide warning and defense against attacks on our systems in space.

Atmospheric Warning and Defense

Over the past twenty years, the United States has significantly reduced forces assigned to atmospheric defense. At the same time, the Soviet threat has increased in numbers and capability with the introduction and continued production of BACKFIRE bombers and improved air-to-surface missiles. A new strategic bomber similar to but larger than our B-1B, called the BLACKJACK, is expected to become operational during the 1980s. Given this growing threat, atmospheric surveillance and warning are required to support intercept operations and to ensure that retaliatory responses can be made. Capable atmospheric surveillance and defense are necessary to preclude U.S. vulnerability to a no-warning bomber attack and to limit the damage that would be inflicted in follow-on bomber strikes. Our current atmospheric warning and defense systems have serious deficiencies which must be corrected.

Atmospheric defense of North America is a cooperative U.S.-Canadian effort. The atmospheric surveillance and warning system is configured to control access to North American airspace during peacetime, provide tactical warning of an air attack and provide command and control for air defense. The current system is composed of ground-based radars in the Distant Early Warning (DEW) Line, the Continental Air Defense Integration North (CADIN)/Pinetree system in southern Canada, and the Joint Surveillance System. However, these radars have limited range and significant gaps in low altitude coverage. Surveillance and command and control of interceptor aircraft will transition from ground-based Regional Operation Control Centers to the E-3A Airborne Warning and Control System (AWACS) aircraft during periods of crisis. Interceptors currently assigned for atmospheric defense include F-106s, F-4s and F-15s.

Within the Department of Defense (DOD), we have developed an Air Defense Master Plan. The first major initiative is to improve our surveillance and warning system through development and deployment of Over-the-Horizon-Backscatter (OTH-B) radars and through improvements to the DEW Line.

The OTH-B radar will correct coverage deficiencies by providing wide-area, long-range, and all-altitude warning of atmospheric attack from the East, West and South. Because of performance degradations from auroral effects, the OTH-B radar is not suitable as a north-looking surveillance and warning system. Therefore, we will improve the existing DEW Line radars with a mix of minimally attended long-range radars and short-range gap-filler radars.

Other significant improvements include additional F-15 air defense and E-3A AWACS procurements. With its long-range radar and look-down, shoot-down capability, the F-15 will substantially improve our air interceptor force. The Air Force plans to convert the five active F-106 squadrons to F-15s. The E-3A is essential to ensure survivable surveillance and to meet command and control requirements. These procurements will greatly enhance our atmospheric warning and defense capabilities.

Missile Surveillance and Warning

The credibility of our national defense policy of nuclear deterrence and escalation control are critically dependent on our ability to provide unambiguous, timely, reliable, and survivable, warning and assessment of an enemy missile attack.

Our ballistic missile attack warning and assessment are currently accomplished by space surveillance systems, three Ballistic Missile Early Warning System (BMEWS) sites, the Perimeter Acquisition Radar Attack Characterization System radar, two PAVE PAWS SLBM detection and warning sites and the FPS-85 and FSS-7 SLBM radars.

One of our objectives for improving the capabilities of our current systems is to improve the BMEWS radar resolution to provide information beyond simple attack warning. We want to be able to determine the accurate magnitude and probable effect of the attack in progress so that our selected response is appropriate. To achieve better attack assessment, we are developing the capability for more precise tracking and improved data processing to provide better preimpact assessment in support of critical, time-sensitive National Command Authority (NCA) decisions. The BMEWS modernization program supports this objective, as well as providing improved reliability and supportability.

A transattack and postattack assessment capability will be provided when the Integrated Operational Nuclear

Detonations Detection System (IONDS) becomes operational. IONDS payloads will be carried on Navstar Global Positioning System satellites. These sensors will report nuclear detonation location, time and yield in near-real-time directly to user terminals. They will allow us to better manage our forces by identifying which enemy resources have been destroyed, and by aiding the recovery and reconstitution of our resources. In addition, the system will provide significant input for the Joint Chiefs of Staff and NCA residual capability assessment in support of conflict termination decisions.

In response to the growing Soviet SLBM threat, we are working to expand our SLBM warning system by deploying two additional PAVE PAWS radars in the southeastern and southwestern United States. These deployments will expand our coverage and enable us to phase out the older, less capable FPS-85 and FSS-7 SLBM radars in Florida. We are also developing upgrades for all four PAVE PAWS radars which will provide improved warning and some attack assessment.

We are continuing to pursue technology to support development of an advanced missile surveillance system for improved long-term survivability and attack assessment. Infrared data on earth background and ballistic missile signatures are being collected and analyzed in the Missile Surveillance Technology program. This effort supports development of the required technologies and designs being conducted in the Advanced Warning System program.

In our Ballistic Missile Tactical Warning/Attack Assessment Support program, we develop and maintain the overall architecture for current and programmed systems to ensure that individual warning and attack assessment elements operate coherently as an integrated system and that modifications to the system are certified as operational prior to IOC declaration.

Space Surveillance and Defense

Our space surveillance and space defense program consists of four elements: improving surveillance, increasing survivability, developing an antisatellite (ASAT) system and enhancing C^3.

The first element focuses on improving our ability to monitor space activities. Surveillance is the key to our warning and defensive options, and in our SPACETRACK program, we are pursuing several near-term efforts to upgrade our surveillance capability. For the far term, the primary thrust of the Space Surveillance Technology program is to develop a space-based space surveillance system which will provide full earth orbit coverage and reduce overseas basing of sensors and provide near-real-time, operationally responsive coverage of objects and events in space. A comprehensive space surveillance architecture has been developed to provide for the orderly evolution of a space surveillance system to satisfy evolving needs for operational and technical data on space objects.

The second element is to make our satellites less vulnerable to attack. Demonstrated Soviet antisatellite capabilities and their potential to intervene electronically, as well as physically, require that we take prudent steps to defend our satellites. In the Satellite Systems Survivability program, we are developing technology and procedures which can be used to increase the survivability of our satellites and their communication links and ground stations.

In the third element, the Space Defense Systems antisatellite program is continuing the development of our own operational antisatellite capability to deter Soviet antisatellite use and, if necessary, to enable us to destroy hostile space systems that threaten our forces.

The fourth element provides the vital command, control, and communications to effectively integrate, coordinate, and manage all space defense resources. The North American Aerospace Defense Command Combat Operations Center program will develop the Space Defense Command and Control System in a phased approach to support the evolving space defense elements.

Other Strategic Defense

The Defense Support Program (DSP) is a key element of our nation's strategic defensive posture. This program provides data to the National Command Authorities, North American Aerospace Defense Command, and Strategic Air Command (SAC). Our development efforts are aimed at increasing the survivability of operational data by designing ground station modifications for compatibility with the survivability improvements of follow-on satellites, and ensuring that these satellites are compatible with the space shuttle. To maintain the operational capability of this vital system, new satellites must be procured to replace those that have failed, worn out, or are unable to meet the growing threat. To meet near-term requirements, four DSP satellites are being procured, two in Fiscal Year 1983 and two in Fiscal Year 1984.

We are proposing again this year the formal initiation of the Air Force element of the DOD's Space Laser program. We are using $20 million of Fiscal Year 1982 funds to determine the utility and feasibility of space laser weapons.

Congressional support in Fiscal Year 1984 is required if we are to continue these efforts. We firmly believe that we must have a much sounder base of research and advanced technology in this area, and that we must resolve uncertainties about military utility and cost effectiveness before any weapon system development decisions can be made.

III. GENERAL PURPOSE

The major threat facing our general purpose forces continues to be the numerically superior forces of the Soviet Union/Warsaw Pact. Western strategy has relied heavily on technological superiority to offset this quantitative advantage. However, massive Soviet investment has substantially eroded our qualitative advantage. Accordingly, we are pursuing carefully selected General Purpose programs which enhance the flexibility, deployability, firepower, and rapid response capabilities of our tactical air forces.

Our General Purpose programs are divided into six categories: Air-to-Surface Attack, Counterair, Electronic Combat, Reconnaissance, Mobility, and Other General Purpose.

AIR-TO-SURFACE ATTACK

One of the most demanding conventional threats the United States and our NATO allies must be prepared to counter is an attack on Western Europe by the Warsaw Pact. Pact strategy is intended to cause the quick collapse of NATO forces, and includes rapid movements of Pact forces, with operations at night and in bad weather.

To counter this threat, NATO depends heavily on the flexibility and responsiveness of tactical aircraft to bring power to bear in threatened sectors. In turn, the Soviets have equipped their ground forces with the most lethal air defense system ever assembled, and they are providing better training for their forces to operate at night and in bad weather conditions.

To meet the Soviet challenge, we have constructed a modernization plan for maintaining our qualitative edge. In the near term, we will develop evolutionary improvements to our existing fighters while continuing balanced procurement of the F-16 and F-15. At the same time, we are improving our overall capabilities through developments, such as the Low Altitude Navigation and Targeting Infrared System for Night (LANTIRN) system, the Joint Surveillance and Target Attack Radar System (Joint STARS), the all-weather target acquisition capability of the Precision Location Strike System (PLSS), and a variety of standoff weapons.

The F-16 is a single engine, lightweight, high performance, multimission fighter capable of performing a broad spectrum of tactical air warfare tasks, including air-to-air and air-to-surface weapons delivery. It is designed for high sortie rates with rapid turnaround, and minimum logistics support. The F-16, however, has limited night/in-weather attack capability. This limitation will be corrected, by radar improvements and incorporation of the LANTIRN system as part of the Multinational Staged Improvement Plan (MSIP).

The MSIP is divided into three stages and is designed to ensure that planned changes to the F-16 will result in an effective counter to the Soviet threat. Stage I provides for essential structural, wiring, and interface changes. Stage II provides for aircraft core avionics and subsystem improvements, and Stage III provides for installation of the improved systems, including the Advanced Medium Range Air-to-Air Missile (AMRAMM), the Airborne Self-Protection Jammer (ASPJ), the Global Positioning System (GPS) and the PLSS Vehicle Navigation Subsystem. In addition, we are evaluating a prototype derivative of the F-16 which offers considerably improved air-to-surface capabilities, while retaining virtually all of its excellent air-to-air characteristics. This F-16 derivative began flight tests last summer.

The F-15 is a high performance, extended endurance, highly maneuverable fighter equipped with a long-range look-down radar and a balanced mix of air-to-air weapons. It is our primary air superiority fighter and is designed to perform both air-to-air and air-to-surface missions. To better utilize its inherent ground attack capabilities, we are evaluating the development of a derivative F-15 aircraft with avionics and armaments improvements to obtain a long-range capability. With conformal fuel tanks, the F-15 can deploy worldwide with minimum tanker support and still arrive ready to fight to attain air superiority. At the same time, it remains capable of being reconfigured for surface attack missions against a variety of tactical targets.

The most serious tactical force deficiency is our limited ability to perform all-weather, day and night interdiction. Currently, only the fully committed and decreasing F-111 force has this capability. Additional aircraft are needed to augment the F-111 in the long-range interdiction mission. Derivatives of the F-15 and F-16 will offer significant improvements in range, payload and the ability to operate at night and under the weather on interdiction missions while retaining their capability to perform the all-weather, air superiority mission.

We are evaluating and conducting a flight demonstration of the F-15 and F-16XL aircraft to investigate several potential capability improvements which could be achieved through design and/or avionics modifications to one or both aircraft to fulfill the requirement for the long-range interdiction missions. Our intent is to develop a dual role fighter to supplement the F-111, while maintaining the inherent air-to-air capability of the F-15 and F-16. The results of this flight demonstration will be presented to the Congress during 1983.

We plan to buy 120 F-16s in Fiscal Year 1984 as part of a four year (480 aircraft) multiyear procurement contract. These aircraft will be integrated into our active forces and assist in the modernization of our National Guard and Air Reserve Forces by freeing earlier model F-16s for transfer. Our plans include requests for 1,625 aircraft through Fiscal Year 1988 with more to follow in later years. As of January 31, 1983, the Air Force has taken delivery of 533 F-16 production aircraft and has activated 18 operational squadrons.

If our Fiscal Year 1983 request of 20 A-10 aircraft is authorized by the Congress, we will complete the planned procurement of 727 aircraft. As of January 31, 1983, we have accepted 675 A-10 aircraft. All 23 planned A-10 squadrons are operational, including six United States Armed Forces in Europe (USAFE) squadrons, six Continental United States (CONUS) squadrons, five Air National Guard squadrons, four Air Force Reserve squadrons and one squadron each in Korea and Alaska. This program is notable in that we have been able to deliver substantial numbers of new, first line combat aircraft to active, Guard, and Reserve units concurrently.

We are improving existing weapons such as the GBU-15 and Maverick missile and a variation of the Laser Guided Bomb for delivery at low altitudes. The expanded launch envelope of the improved Low Level Laser Guided Bomb (LLLGB) allows for low level attack of fixed point targets such as bridges and tunnels. These efforts will improve accuracy, reduce aircraft exposure to surface-to-air threats and enhance tactical flexibility. The LLLGB also takes advantage of improved target acquisition below low ceilings and has better guidance under limited visibility conditions common to Europe.

Maverick is the Air Force's primary tactical air-to-surface missile. It provides a high single shot kill capability against close air support, interdiction and defense suppression targets. The inventory versions are the AGM-65A and B which are television (TV) guided. The TV seekers limit Maverick's use to visual contrast conditions (daytime only). Effective employment can be degraded by smoke, haze, and shadows.

In Fiscal Year 1984 we will buy 2,600 Imaging Infrared (IIR) guided Maverick missiles to expand our ability to destroy small, hard tactical targets during night and limited visibility conditions. The IIR Maverick will complement the daylight only TV Maverick currently in the inventory and the laser version being developed for the Marine Corps.

The Maverick can currently be employed on the F-4, A-7D, A-10, F-16 and the F-111F.

We will also continue qualification of a second source for the IIR Maverick to stimulate competition and to allow for increased annual production quantities. A qualification program is scheduled to start this year with an option for later production. We also plan to complete research and development (R&D) to integrate the Maverick imaging infrared seeker with the GBU-15.

One of our most serious deficiencies is our inability to effectively attack targets at night and in adverse weather. Based on current technological assessments and the need to field a capability quickly, we are planning to correct this deficiency incrementally. One significant step for our single-seat A-10 and F-16 fighters and the F-15 and F-16 derivative aircraft is the LANTIRN system which is now being developed. LANTIRN will allow us to capitalize on our fighter force investment by providing a 24-hour, under-the-weather, air-to-surface precision attack capability on selected aircraft. It also allows our fighters to penetrate at low altitudes, thus reducing exposure to defenses. To further enhance our night warfare capability, night vision goggles are being evaluated. The goggles provide visual orientation in darkness and complement LANTIRN capabilities. We are also investigating advanced technologies which can expand our capability to attack targets in all weather conditions. Fiscal Year 1984 funds will be used to continue flight test of the LANTIRN navigation and targeting pods and to initiate production readiness for the navigation pod.

To cope with our disadvantage in numbers, we are emphasizing weapons that achieve much higher effectiveness through accuracy and lethality. We are reducing aircraft attrition to the dense Warsaw Pact defenses through standoff or reduced exposure. The Wide Area Antiarmor Munitions (WAAM) program is an umbrella program whose objective is to develop a weapon system that provides a multiple armor kills-per-pass capability in day/night and adverse weather conditions. These capabilities will allow us to interdict second echelon forces before they can reinforce the first echelon.

Our WASP missile system is an aircraft mounted pod system with each pod containing small minimissiles. Each minimissile has an antiarmor lock-on-after launch capability. Funding in Fiscal Year 1984 is for WASP full scale development; the WASP procurement request is scheduled for Fiscal Year 1987.

Our 30mm gun pod will provide attack aircraft with a capability against armor and other vehicles. The pod is a reliable, easy-to-employ, strap-on weapon which we plan to deploy with the A-7, F-4, and the F-16. We currently plan to complete procurement of the 30mm gun pod in 1984 with a total buy of 299 pods.

The Joint STARS is a multimode radar system that pro-provides an integrated approach to real-time detection and attack of second echelon targets. Joint STARS is an Air Force led program that merges the technologies of the PAVE MOVER Engagement System and the Army Battlefield Data System. Joint STARS offers the potential to delay, disrupt, or destroy massed Warsaw Pact ground forces, using a variety of weapons. The PAVE MOVER Engagement System has demonstrated the ability to guide standoff missiles against moving armor and has vectored penetrating tactical aircraft against moving columns of tanks. When coupled with advanced munitions, such as WAAM, Joint STARS offers a powerful capability to see deep and strike deep.

The MRASM is a conventionally armed cruise missile under joint development with the Navy. It will give aircraft the capability to engage high value targets, such as airfields, while remaining outside of enemy defenses.

We are also developing the Standoff Attack Weapon (SAW), a short range standoff weapon that will carry a variety of munitions, including airfield attack submunitions. SAW will provide a weapon with payload flexibility while enabling the aircraft to avoid the terminal defenses around the target.

In the near term, the French Martra Durandal rocket-assisted runway cratering munition will give us an effective runway attack weapon which can be delivered at low altitude and high speeds. We are also evaluating other airfield attack concepts, such as Axe, a large surface-to-surface ballistic missile for use in the European theater.

COUNTERAIR

Over the last few years Soviet tactical air power has changed from a limited range ground controlled intercept (GCI) defensive force to a formidable offensive force, including longer range aircraft with much improved avionics. They now have the capability to conduct strikes against targets anywhere in NATO Europe. In addition, they are fielding a new generation of fighters with many capabilities comparable to our present generation F-15s and F-16s and are developing a new air-to-air missile to give their aircraft a look-down, shoot-down capability.

To meet this challenge, we must continue to procure and improve our F-15 and F-16 fighter aircraft. The F-15 provides an outstanding close-in visual and medium range all-weather kill capability against enemy aircraft. It is the primary air superiority fighter in the tactical air forces. As of January 31, 1983, we have accepted 687 F-15 aircraft and have activated 18 of 40 operational squadrons.

The Fiscal Year 1984 budget raises F-15 production to the more efficient rate of 48 aircraft per year and provides for advance procurement to support production of 72 aircraft in 1985, an even more efficient rate. The increased rate coincides with the orderly incorporation of improved production avionics developed to maintain the superiority of the F-15 in its mission into the 1990s by improving combat identification, electronic counter-countermeasures (ECCM) and self-protection capabilities.

We plan to continue to procure F-15s to sustain and modernize tactical forces, reach force structure goals and correct strategic defense force deficiencies.

In order to improve our readiness to an acceptable level, we must continue procurement of AIM-7 and AIM-9 missiles. In the future, the Advanced Medium Range Air-to-Air Missile (AMRAAM) is required to equip the F-16 with a beyond visual range, all-weather, air-to-air capability and to improve the lethality of our F-15 force.

The current adverse weather air superiority armament for the F-15 aircraft is the AIM-7 Sparrow air-to-air missile. The Fiscal Year 1984 request is for the AIM-7M, the latest version. It has an advanced monopulse seeker which provides improved ECCM capabilities and better look-down, shoot-down capabilities than the AIM-7F.

Sparrow performs a key role in countering the large number of enemy aircraft by providing the capability to attack enemy aircraft at medium beyond-visual-ranges. We must continue to procure the AIM-7 Sparrow through Fiscal Year 1984. Our near-term objectives are to increase the number of missiles available to our operational forces and to correct our current inventory shortage.

The AIM-9 Sidewinder is an air-to-air, short-range missile and is the primary within-visual-range air superiority armament for both the F-15 and F-16. The Sidewinder is smaller and has a shorter range than the AIM-7; it is a heat seeking weapon rather than radar guided. The Fiscal Year 1984 request is for the latest version, the AIM-9M, which has .improved capabilities against infrared countermeasures, improved acquisition and tracking ranges, a reduced smoke motor, and a closed cycle cooler. As with the AIM-7 Sparrow, the supply of Sidewinder missiles is below our inventory objectives. Our immediate objective is to increase the quantities on hand to improve our operational readiness.

Our RDT&E emphasis is on increasing the air-to-air capabilities of our fighters. The most important program under development in this area, which will enhance our combat effectiveness while reducing aircrew vulnerability, is the AIM-120A, AMRAAM. AMRAAM will provide a significantly improved performance envelope, increased average velocity, and a launch and maneuver capability that will help our aircrews avoid the close-in dogfight. AMRAAM is an all weather, all aspect, all environment air-to-air missile; it is smaller, lighter and faster and with its active radar guidance, it allows pilots to attack multiple targets on a single intercept.

AMRAAM is compatible with the F-14, F-15, F-16, F/A-18 and appropriate NATO air defense and air superiority aircraft. Both the United Kingdom and Germany are planning to integrate AMRAAM on their aircraft. Fiscal Year 1984 RDT&E funding will continue full scale development with initial Development, Test, and Evaluation/Initial Operational Test and Evaluation (DT&E/IOT&E) test firings from the F-16. Production is planned for a Fiscal Year 1985 start, with initial procurement funding in the Fiscal Year 1984 budget request.

We are also stressing the development and integration of beyond-visual-range identification technologies into our aircraft to allow us to fully exploit our weapons capabilities. Our identification developments are accomplished in two programs: Combat Identification Technology and Combat Identification Systems. These programs, as well as some other service identification efforts, are coordinated and managed by a single joint program office, headed by the Air Force.

While improvements to existing fighters will help maintain the competitive combat capability of our fighter force during the current decade, feasible modifications to these early 1970s' designs will not be adequate against the 1990s' generation of Soviet fighters. To achieve superiority over the expected Soviet fighter development, we are pursuing the Advanced Tactical Fighter Technology (ATFT) Program. This development will take advantage of technical opportunities in the development of airframe and flight controls, engine, avionics, weapons integration, supportability, and manufacturing technology for increased efficiency, capability and affordability. The Fiscal Year 1984 RDT&E request is for continuation of engine and airframe technology and concept development activities. Commitment to a specific design concept and full scale development will not occur until Fiscal Year 1987.

ELECTRONIC COMBAT

The Soviets continue to develop, deploy and provide their allies with air defense systems resulting in a more complex, qualitatively improved and more dense strategic and tactical threat environment. They emphasize mobility and use both radar and electro-optical means for target acquisition and tracking. The growth in their air defense capability has also been marked by increased reliance on C^3 as they strive to maintain a highly reliable, efficient, and integrated system.

Because of the nature of this threat, we have placed and will continue to place considerable emphasis on electronic combat. Our objective is to achieve a mix of systems which disrupt, degrade, deceive, or destroy an enemy's air defense network in order to ensure the survivability of our aircraft and aircrews. To accomplish this, we have programmed updates for our operational defense suppression systems, and we are pursuing the continued development of several new systems.

Today, the F-4G Wild Weasel is our primary system for destruction of tactical emitter systems, such as air defense radars. In Fiscal Year 1984, we have programmed funds to develop and procure updates to the existing F-4G Wild Weasel force to keep pace with evolving Soviet improvements. In addition, in Fiscal Year 1984, we will initiate procurement of additional Wild Weasel modified aircraft to maintain our limited force structure.

We are also continuing with the Navy in the joint acquisition of the High Speed Anti-Radiation Missile (HARM), which will greatly improve the lethality of the F-4G. HARM will be used against surface-to-air missile guidance radars and early warning radars, as well as air defense artillery radars. It can, in conjunction with the F-4G, defeat not only the present, but also the more sophisticated threat emitters projected in the near future.

Our central effort for improving our long-term strike capability against emitters is the Precision Location Strike System (PLSS). PLSS is a near-real-time, all-weather, day and night system which will give us the capability to precisely locate and strike tactical targets throughout the theater area. It is designed to counter sophisticated air defense radar threats and to increase the effectiveness of other defense suppression assets. No other system, existing or proposed, can provide the unique capabilities of PLSS. PLSS has the flexibility to handle new threat characteristics and wartime frequency changes by the enemy. Of all the defense suppression systems, it is the least affected by enemy countermeasures. PLSS also has an inherent capability to accept technological growth through Pre-Planned Product Improvement (P^3I) techniques. Although PLSS is valuable in its own right, when coupled with manned aircraft and a mix of conventional weapons, it is a powerful suppression system.

Fiscal Year 1984 funds are also requested to begin development of the Joint Tactical Missile System (JTACMS) with the Army. In intense conflicts, the rapid neutralization of enemy surface-to-air threats is critical in order to permit our reusable aircraft attack systems to operate most effectively. JTACMS, with the range to standoff outside the threat envelopes, is needed primarily in the early days of an intense conflict to work with other defense suppression systems. As is the case with several of our other weapons, JTACMS will use PLSS information and guidance to attack enemy defenses. This weapon will also be compatible with other systems, such as Joint STARS, and would have the capability to attack moving vehicles using smart submunitions.

To improve the disruptive component of electronic combat we are emphasizing both support and self-protection electronic countermeasures (ECM). For support jamming, we are continuing the EF-111A modification program to provide both a standoff and penetrating jamming capability to counter the Soviet early warning, ground control intercept and acquisition radars. The IOC is scheduled for the first quarter of Fiscal Year 1984, and the final delivery is scheduled in Fiscal Year 1986. The Soviet and Warsaw Pact forces are expected to continue to dramatically increase the number of their Early Warning, GCI and acquisition radars and to significantly improve their ECCM capabilities. Updating the EF-111A reprogrammable jamming system will be a continuing effort to meet this threat.

Included in the Fiscal Year 1984 EF-111A program is the development of an Operational Flight Trainer (OFT) to provide training for both the pilot and the electronic warfare officer. The OFT simulator is critical to establishing and maintaining aircrew proficiency, since security and other restrictions preclude actual operation of electronic warfare equipment.

Since the Soviets are relying on their C^3 networks for effective battlefield management, we are placing heavy emphasis on tactical C^3 countermeasures. Our immediate emphasis is on Compass Call, an EC-130H aircraft designed to disrupt selected portions of the Soviet force management system. The baseline Compass Call system uses off-the-shelf equipment and technology to modify ten existing C-130 aircraft.

A development program for improvements was started concurrent with the baseline acquisition to add capabilities against new targets as well as to correct known deficiencies. Four operational baseline aircraft were delivered in Fiscal Year 1982; the remaining six are scheduled for delivery in Fiscal Year 1983. Last year's procurement program provided modification kits for the final six baseline systems, as well as the first improvement development. In Fiscal Year 1984 we will continue our modification program and develop improvements to the baseline Compass Call systems.

In the area of self-protection ECM, we are continuing the procurement of ALQ-131 pods in Fiscal Year 1984. To keep these pods current with the changing threat, we are also continuing our ALQ-131 staged improvements, such as our modifications to add advanced jamming technology.

Another important area is our update to radar warning receivers which alert our aircrews of impending attack. In a joint development with the Navy we are improving tactical aircraft protection through the Airborne Self-Protection Jammer (ASPJ) program for the F-16, F/A-18, F-14 and A-6E. The ASPJ effort is also focusing on reducing the proliferation of electronic warfare equipments. In Fiscal Year 1984, ASPJ DT&E is planned for completion. F-16s not scheduled to receive ASPJ will continue to carry ECM pods. A production decision for ASPJ is planned for Fiscal Year 1985.

RECONNAISSANCE

Reconnaissance and surveillance systems provide decision makers at all levels with tactical information and intelligence data required to minimize the likelihood of surprise arising from enemy initiatives by locating key targets on the battlefield. Therefore, the development and deployment of these systems is critical to the credibility of NATO's defense of Europe and to the general U.S. combat capability wherever and whenever it might be employed.

To meet the tactical commanders' needs for near-realtime information, as well as supporting the surveillance mission, in Fiscal Year 1984 we plan to procure five TR-1 aircraft. A tactical version of the U-2R, the TR-1 is specifically designed to provide a high-altitude, standoff tactical surveillance capability. The TR-1 is capable of carrying a variety of modular payloads and reconnaissance systems, such as PLSS and the Advanced Synthetic Aperture Radar System (ASARS). ASARS, a high resolution radar for mapping fixed targets, is planned for production in Fiscal Years 1983-1984. These sensors, along with associated ground stations, data links and radio relays, will provide continuous day or night, all-weather surveillance in near-realtime.

MOBILITY

To protect our global interests, we have found it necessary to deploy some of our forces forward and pre-position equipment and supplies in likely areas of conflict to offset the delay in the resupply pipeline. However, we still maintain the majority of our forces, their equipment and supplies at home. These home-based forces, supported by mobility resources, can be projected anywhere in the world.

Airlift is the most visible, responsive, and flexible element of our mobility resources. Its primary role is to project and sustain combat forces in a crisis or battle area until other means of transportation can deliver the required follow-on support. In many situations, airlift is the only means of responding rapidly, either because of the geographic location or the speed with which the threat develops. In these situations, airlift brings the forces to bear which could be decisive in the early days of a conflict.

The existing airlift force continues to have serious inadequacies in its capabilities to meet the mobility requirements of our conventional war strategy. The Air Force's RDT&E and Procurement strategy remains committed to correcting this airlift shortfall. We have ongoing programs under way to improve the readiness, sustainability and capabilities of our current airlift aircraft. These programs include increasing spare parts stocks and crew ratios to permit higher utilization rates of our C-5 and C-141 aircraft, increased aerial port personnel and airlift support equipment, and upgrade of the Military Airlift Command (MAC) C^3 system. The C-5A wing modification will extend the lifetime of this system by adding 30,000 hours to the wing's lifetime. The first C-5A aircraft entered the modification line in February 1982 and 26 aircraft will be completed by the end of Fiscal Year 1984. The remaining aircraft are scheduled to be completed in Fiscal Year 1987.

Another of our problems has been the chronic and significant shortfall in our capability for long-range airlift of oversize and bulk cargo. The C-141 stretch program, which extended the fuselage and added an air refueling receptacle, increased the C-141's average payload by some 30 percent. This modification was recently completed in 1982. Fiscal Year 1984 funds for the C-141 will continue needed improvements in several on-board systems such as station keeping equipment, which enables us to deploy and employ a light army brigade size force in adverse weather. However, even after we have completed the enhancements planned for the existing force, we will still have serious shortfalls in our capability for intertheater airlift of outsize, oversize, and bulk cargo.

Compounding these intertheater shortfalls are the inadequacies of our intratheater distribution systems. We continue to have a need for intratheater mobility and resupply. The current backbone of our intratheater airlift force is the C-130. Therefore, we are requesting Fiscal Year 1984 funds to continue modifications which will ensure the continued safe operation of this aircraft.

For the near term, we are procuring additional KC-10s and the C-5B to provide substantial improvement to the U.S. defense mobility posture. Since the KC-10 and the C-5A aircraft are in the Air Force inventory, existing training and support elements will allow the new KC-10 and C-5B aircraft to transition quickly to operational status.

The air-refuelable C-5 has an intercontinental range and can carry all the major firepower and equipment items of our modernized ground forces. It is the only aircraft presently capable of transporting key outsize firepower equipment needed by the Army and Marine Corps to respond to worldwide contingencies. Our in-service fleet of 77 aircraft is not adequate to meet these outsize cargo needs. We plan to increase the C-5 force to 127 aircraft by procuring 50 C-5Bs through Fiscal Year 1987. The C-5B will be the original C-5 design, updated with all currently approved engineering change proposals--a 30,000 hour service life wing, modernized TF39-1C engines, improved avionics, and more durable and corrosion resistant aluminum alloys.

By acquiring C-5Bs, we will be able to begin promptly to correct the serious intertheater shortfall in our outsize cargo airlift capability by improving our ability to transport large volume, heavy weight cargo over intercontinental distances. Acquisition of C-5Bs will enhance our ability to reinforce Europe in the early days of a conflict and our ability to rapidly project combat forces worldwide. With no R&D required and with an existing production base, we will be able to begin to field C-5Bs in the mid-1980s.

Along with airlift, aerial refueling is essential to successful deployment operations. We are planning a force of 72 KC-10As and will complete procurement by Fiscal Year 1988. The KC-10As will greatly improve the Air Force capability to support contingency operations, reduce our dependence on foreign bases, and enhance our capability for the rapid deployment of combat forces. Airlifter cargo loads can be greatly increased and delivery times to the destination reduced through use of the KC-10A because of its large fuel offload and long range capabilities. The KC-10A also can carry considerable amounts of cargo. In addition, the KC-10A will make more KC-135 tankers available to support the strategic bomber force. KC-10A aircraft are being procured using a multiyear procurement contract which provides substantially lower prices than those on comparable commercial sales.

For the long term, the C-17 is a key element in the Air Force's program to redress our airlift shortfalls, especially in the areas of outsize firepower/equipment and intratheater airlift. This simple, rugged, reliable airlifter will incorporate low risk technology to provide long haul efficiency, as well as safe and routine operations into small austere airfields. The air-refuelable C-17 will have the capability to carry all types of air cargo over intercontinental distances, as well as the ability to operate directly into and out of the small, austere airfield environment typical of contingency areas around the world. It will provide a full spectrum of delivery modes: airland, airdrop (including outsize), low altitude parachute extraction (including outsize), and rapid/combat offload.

The C-17 is the capstone of the airlift improvement program. It provides three vitally needed capabilities: (1) it completes the recommended increase in intertheater outsize airlift capability stated in the Congressionally Mandated Mobility Study; (2) it provides the theater commander with outsize intratheater capability; and (3) it provides a candidate for replacing some C-130s and eventually the C-141 force. In addition, the C-17 will be a highly efficient intertheater airlifter designed to complement the existing force. The Air Force request for Fiscal Year 1984 continues a prudently paced development program.

Other key mobility programs include the CT-39 Replacement, the European Distribution System Aircraft (EDSA), Combat Helicopter Modernization, Joint Service Vertical Lift Aircraft Development program (JVX), and C-140 replacement.

The CT-39 program addresses the need to replace the existing fleet because of aircraft age and escalating maintenance costs. The aircraft's wartime mission is to ferry essential personnel and cargo throughout the United States and other parts of the world. In peacetime, the aircraft is used to provide pilot seasoning and, as a by-product of that training, the routine movement of passengers and cargo on a strict priority basis. In Fiscal Year 1984, we will continue the CT-39 replacement multiyear lease contract, under which the government will provide fuel and pilots and the contractor the required maintenance and support.

Our European Distribution System (EDS) is a program to ensure wartime distribution of critical spares and aircraft engines in the European theater to enhance readiness and sustainability. The EDS program consists of three elements: logistics C^3, forward stockage of spares in Europe, and the EDSA--the aircraft to provide reliable air transportation of critical spares and aircraft engines. Our procurement program supports this last element and includes plans for 18 small, off-the-shelf commercial cargo aircraft. Our Fiscal Year 1984 request procures the last sixteen EDS aircraft.

Our Combat Helicopter Modernization program addresses the urgent need to modernize the Air Force's Combat Rescue and Special Operations Forces to cope with increasing threats and to overcome severe maintenance problems resulting from obsolete equipment. We are developing a derivative of the Army UH-60 Black Hawk--a helicopter of proven reliability, maintainability, and survivability. Using the basic H-60, we are integrating improved avionics for precision low-level navigation at night and in adverse weather, adding an auxiliary fuel tank, incorporating an air refueling capability, and installing other necessary Air Force mission equipment. The Fiscal Year 1984 request for this helicopter, which is designated the HH-60D, includes funds for research and development and advance buy funding in procurement. The HH-60D will be operational in the active force, the Air Force Reserve, and the Air National Guard.

The JVX program is a DOD initiative to develop a common DOD vertical take off and landing (VTOL) vehicle for multiservice use. The executive agent for the program is the Navy, and the program manager is assigned from the Marine Corps. Air Force applications include combat rescue and special operations in conjunction with the HH-60D. The program will take advantage of demonstrated tilt-rotor technology and promises to reduce total DOD costs through a common development program.

The Air Force has 11 C-140B aircraft which are used to transport high ranking government officials and foreign dignitaries in the United States and Europe. The replacement program includes two range requirements: one for coast-to-coast range (2200 nm) and the other for a medium range (1400 nm), with both able to carry 14 passengers. We have structured a competitive program to include both range requirements. The program began with the lease of two long and one medium range aircraft in Fiscal Year 1983. Fiscal Year 1984 funds will continue the lease of these aircraft with procurement planned to begin in Fiscal Year 1985.

OTHER GENERAL PURPOSE

Due to their unique characteristics, the Ground Launched Cruise Missile (GLCM), Rapier and Stinger surface-to-air missiles, Chemical/Biological Defense Equipment and MC-130H programs are included in a separate area, called Other General Purpose programs.

GLCM, a surface-to-surface variant of the Tomahawk cruise missile, is a major initiative to enhance our nonstrategic nuclear forces. The major requirement for GLCM stems from concern among our allies about the credibility of the NATO Alliance's nuclear deterrent. In December 1979, in response to the adverse trend in strategic nuclear forces and the deployments of the SS-20 ballistic missile and BACKFIRE bomber, the Alliance reached a decision to adopt a combined program of nonstrategic nuclear forces modernization and arms control. Under the terms of this program, the Alliance will move ahead with deployments of the Pershing II and the GLCM, while simultaneously advancing nonstrategic nuclear arms reduction proposals.

The primary elements of the GLCM system are the missile itself, a Transporter-Erector-Launcher (TEL) and a Launch Control Center (LCC). In Fiscal Year 1984 we are requesting funds to procure 120 GLCM systems and to continue our RDT&E effort.

Currently, our air bases in the United Kingdom are not protected from hostile aircraft by point defense systems. We are procuring the British developed Rapier short-range air defense fire units which will be operated by the Royal Air Force (RAF). In addition, we will procure test equipment and restock spares. The United Kingdom will man and maintain the system with RAF personnel.

In Fiscal Year 1984, we are also procuring the U.S. Army developed Stinger air defense missile system for some of our bases in South Korea. This capability will greatly improve our point air defense posture in Korea.

Our forces may be called upon to withstand a chemical/biological attack and conduct operations in a toxic environment. In the past few years, we have progressed from a nearly nonexistent chemical/biological defense capability to a limited capability at our bases in Europe. Attaining an improved and extended defensive capability is dependent upon our RDT&E program.

In the Chemical/Biological Defense Equipment program, we are developing protective clothing, protective shelters, decontamination materials and equipment and devices to detect and warn of chemical/biological agents. In Fiscal Year 1984, we will complete the development of the improved, binary chemical weapon, Bigeye. We strongly support the DOD production of the Bigeye as an essential element of modernizing our aging and inadequate chemical retaliatory stockpile.

Finally, over the next several years, we will be modernizing our unconventional warfare resources. In Fiscal Year 1984, we are requesting funds to buy two MC-130H aircraft.

IV. SPACE

Space systems perform many missions more efficiently than earthbound systems. Spaceborne surveillance, warning, communications, meteorological, and navigation systems increase the effectiveness of military operations on the modern battlefield.

The Soviets are well aware of the military utility of operating in space and have committed significant resources toward a sizable space presence. Over the last decade, Soviet space launches have significantly exceeded those of the United States, with the majority of its launches being for military purposes. In addition, the Soviets are supporting an active man-in-space program, and they have deployed and continue to test an operational antisatellite capability.

In contrast, our space plans for the next 20 years include three major objectives. First, we need to expand our military capabilities in space. This is inevitable, because of the military and economic advantages of space surveillance, communications, and navigation. Second, we need to develop a capability which will provide free access to space and enable us to protect our systems once they are in orbit in space. Third, and most importantly, we need to pursue a vigorous R&D program to give us future military options in space.

Accordingly, we are proceeding with the following plan for space operations. We will make our space systems, the satellites, the ground processing stations, and the user interfaces, more survivable from attack. We will improve, through evolutionary changes, the surveillance, communications and navigation capabilities of our space systems, and the robustness of our space system network by removing single nodes, procuring backup satellites, and lessening our dependency on overseas ground stations.

In addition, we are also concentrating our efforts on doing more with each launch by deploying satellites with multiple missions and with much longer operational life. To optimize our deployment and on-orbit performance, we are developing a new space launch capability, improving our space operations capabilities, and aggressively pursuing advanced, space-related technology.

One of our major efforts is the Space Transportation System (STS). The STS is a national program approved by the President in 1972 to provide U.S. Government, commercial and foreign users routine access to space. The STS consists of the Space Shuttle, upper stages, Spacelab, launch and landing facilities, and mission control facilities. The National Aeronautics and Space Administration (NASA) is responsible for the development and operation of the Space Shuttle. The Air Force is the DOD executive agent for military applications of the Shuttle. We are responsible for the development and operation of the Inertial Upper Stage (IUS), joint development with NASA of a common short Centaur G upper stage, acquisition and operation of the West Coast launch and landing facilities at Vandenberg AFB, and acquisition and operation of the dedicated control center, the Consolidated Space Operations Center (CSOC).

We have had several significant and long awaited firsts in the recent past which culminated long and arduous development programs: the first Titan III (34)D launch (October 1982); and the first IUS on a Titan (October 1982). Both were extremely successful. The IUS accuracy is outstanding. Its performance is a convincing demonstration of the validity of the design philosophy which stressed accuracy and reliability. The first IUS in a Shuttle is planned for launch in 1983.

Our national policy is to transition all national security spacecraft from expendable launch vehicles to the Shuttle. Accordingly, our Fiscal Year 1984 request does not include funds to continue production of Titan expendable launch vehicles. To hedge against the possibility of Shuttle delays or groundings, we are acquiring through Fiscal Year 1983, a limited number of backup expendable launch vehicles. This backup capability will protect against delays or any unanticipated problems while bringing the Shuttle to an operational status. These efforts are being supported by our Space Boosters program.

Our Space Launch Support program funds DOD Shuttle operations including Vandenberg AFB, the orbiter flight charge reimbursements to NASA and procurement of the IUS and Payload Assist Modules Delta class (PAM-D) for all Air Force space programs. In Fiscal Year 1983, we will initiate a block buy of the PAM-D, which was approved as part of the 28 vehicle Navstar GPS block buy. Our plan to initiate a consolidated (Air Force, other DOD, NASA) eight vehicle IUS buy in Fiscal Year 1983 has been cancelled because of Congressional direction to NASA to develop a CENTAUR and NASA's subsequent plans to terminate production of three IUS vehicles on the existing production contract. Using Fiscal Year 1983 missile procurement funding, we will complete the production of two of these NASA vehicles and using RDT&E funding in Fiscal Years 1983, 1984 and 1985, we will complete the production of the third vehicle. This action provides sufficient vehicles to support Air Force requirements through early 1988, thereby precluding the need for a new IUS buy in Fiscal Year 1983, and avoiding any contractor termination costs. Our Fiscal Year 1984 Procurement request allows us to continue the PAM-D block buy and to provide logistics support for the IUS and the Vandenberg launch site. Our next buy of the IUS is planned for Fiscal Year 1985.

Our Fiscal Year 1984 request also allows us to continue working on the new CSOC. For management, operational, and economic efficiencies, CSOC combines two major space missions for DOD: satellite control, and Space Shuttle flight planning, readiness and command/control. The CSOC consists of a Satellite Operations Complex (SOC), which will share the satellite control work load with the Satellite Test Center (STC), and a Shuttle Operations and Planning Complex (SOPC), which will conduct flight planning, readiness, and operations for military Shuttle missions.

In the role of satellite control, the CSOC will enhance our operational capabilities by providing greater mission flexibility and increased survivability. The STC and the CSOC will provide mutual emergency backup for mission essential functions should outages occur at either center. In its Space Shuttle role, CSOC will, in the future, directly control DOD Shuttle missions and enhance protection of national security information. During early Shuttle operations, this function will be performed by the NASA Shuttle control facility at Johnson Space Center (JSC). JSC, however, is very limited in its ability to conduct classified operations. Survivability for this function will also be increased by having two facilities, with JSC serving as the backup to CSOC for DOD missions.

We are also improving our ability to operate in space. The obsolete computer system used by the Satellite Control Facility (SCF) to control on-orbit satellites severely limits our current operations. In Fiscal Year 1984, we will continue the SCF Data System Modernization program which will correct this limitation and give us the ability to better operate existing satellites and the flexibility needed to control more sophisticated satellites currently in development. Identical computers will be installed in the CSOC for the complementary satellite operations there.

The Air Force is committed to maintaining the technical superiority of our space systems through continual testing of new concepts and by investigating the effects of the space environment on our systems. The Space Test Program (STP), Space Vehicle Subsystems, Advanced Military Spaceflight Capability, as well as various Technology Base projects, support this objective.

The tri-service STP provides the spaceflights for DOD experimental payloads needed to gather information critical to the development of future space systems. The STP simplifies the experimenter's job by centralizing management for the tasks needed to integrate and launch a free-flying payload or integrate and operate a shuttle sortie payload. Furthermore, the STP has been designated by DOD to lead in developing the Space Shuttle as a manned space laboratory.

The Space Vehicle Subsystems program investigates promising space vehicle subsystems technologies which offer improvements in the effectiveness, efficiency, weight, and survivability of our space vehicles. Our Fiscal Year 1984 efforts are focused on space guidance, space power supplies, satellite secondary propulsion, and space computer technologies. This program also funds the development of the Military Space Systems Technology Model (MSSTM), which is a widely acclaimed tool for defining and prioritizing our space technology efforts.

The Advanced Military Spaceflight Capability program will provide the technology to permit the development of a responsive, flexible, survivable, and economical military space transportation system in the mid to late 1990s. There is a range of potential military missions which will require the capability to operate in transatmospheric and low earth orbit regimes. Our current technology will not support development of such systems. This program is being established to focus on the unique military technologies which cannot be covered in related NASA technology programs. In Fiscal Year 1984 we will define the military utility of alternative configurations and begin to develop the pacing technologies that we will need to enable future system decisions. Many of these technologies will be applicable to both high speed aircraft and space vehicles. It requires from 15 to 20 years to move from the start of technology development to an operational space system. This, combined with our ever increasing dependence on space systems for national defense, results in the need to begin this technology effort now. The program is structured to allow us to decide in the late 1980s whether to proceed with development of advanced military spaceflight systems.

Two major satellite programs included in the Space mission area are the Defense Meteorological Satellite Program (DMSP) and the Navstar GPS. DMSP satisfies our need for accurate and timely weather data which is vital to successful military operations. DMSP, an operational advanced weather system, is DOD's most important single source of weather data. In Fiscal Year 1984, DMSP will be in the second year of procurement of four satellites. The major RDT&E effort will be the third year of design, development, and production of a Space Shuttle qualified primary imaging sensor. The RDT&E program supports DMSP transition to Shuttle launch by 1990. The DMSP program will also be in the second year of procurement of nine Marine Corps advanced transportable weather terminals and in the first year of procurement of 12 Air Force terminals.

We are developing the Navstar GPS to be the first direct application of space for our fighting forces. GPS will provide users in all services with precise position and timing information on a 24-hour, global basis under all weather and visibility conditions. This capability will significantly enhance the mission effectiveness of all U.S. and NATO forces. For the first time, combined military operations will be coordinated by using a common grid and time reference for land, sea, and air units. GPS precision will increase the probability of damage to targets and enhance our flexibility under a strained combat logistics environment by allowing the use of iron bombs against targets with known GPS grid coordinates with accuracy approaching smart weapons. GPS will also allow low-level ingress/egress for flexible routing, as well as totally passive operations for increased survivability.

In addition, the system holds real promise for numerous civilian applications. For example, the GPS receiver/processor (GPSPAC) payload on the Landsat-D satellite is helping NASA map the world with much greater accuracy than was previously possible. GPS satellites will also play another vital defense role by being hosts and providing precise time for Integrated Operational Nuclear Detonation (NUDET) Detection System (IONDS) payloads. IONDS will provide damage and strike assessment information, thereby enhancing strategic force management. Very accurate global detection and reporting of nuclear detonations will be available for the first time when this system is deployed.

GPS is the most survivable space system in the inventory today. Its design features nuclear hardening, link protection, a high orbital altitude, and a widely dispersed constellation. As for cost, we consider the revolutionary and vastly superior navigation capability GPS will provide well worth the expense, and we are fully committed to the program.

In Fiscal Year 1984, GPS production funding will continue the 28 satellite block buy that was initiated in September 1982. We are buying a total of 28 satellites, including an 18 satellite constellation, on-orbit spares, and initial replenishment spares. Buying this quantity of satellites using the Congressionally approved multiyear approach will result in significant cost savings over annual satellite buys.

V. COMMAND, CONTROL, AND COMMUNICATIONS (C^3)

C^3 systems link together all of our national defense assets. C^3 systems are essential to implement strategy, control forces, and employ weapons in modern warfare. These systems support day-to-day operations, provide time-critical warning information to decision makers, facilitate accurate situation monitoring and allocation of resources in crisis situations, and permit the appropriate and effective employment of military power in wartime.

Recognizing the importance of C^3 in directing military operations, the Soviets are placing heavy emphasis in their doctrine on the disrupting of our C^3. The threats to our systems include both physical and electronic attacks.

In response to this growing threat, our primary objective is to increase the survivability, security, and jam resistance of our C^3 links. Another objective is to improve both the reliability and interoperability of our systems. Finally, we want to exploit new technologies to more effectively meet future C^3 requirements and overcome future threats to our system. The discussion in this chapter will focus on our strategic, tactical and defense-wide C^3 modernization programs.

STRATEGIC C^3

Our Strategic C^3 programs include warning and assessment systems, command centers, and supporting communications systems. Since the warning and assessment systems were discussed in the Strategic Defense section, this section will concentrate on command centers and communications.

One of the key features of the President's strategic program is the modernization of strategic C^3. For deterrence to be a successful policy, we need effective strategic C^3 systems which will be able to support the wartime planning and employment of our nuclear forces. In the past, we have not modernized our C^3 systems fast enough. As a result, these systems have insufficient survivability and reliability to operate dependably during a nuclear conflict. Consequently, we are increasing the survivability and endurance of our strategic C^3 systems. Our objective is to make these systems as strong as the forces they support.

One of the primary programs for enhancing command and control of our strategic forces is the Air Force Satellite Communications (AFSATCOM) System. The AFSATCOM system consists of aircraft terminals, ground terminals, and communications packages on several satellites, including the Fleet Satellite Communications (FLTSATCOM) System, and the Satellite

Data System (SDS) satellites, along with classified host spacecraft. In our AFSATCOM RDT&E program, we are developing improvements to our existing ultra high frequency (UHF) AFSATCOM terminals which will allow us to better withstand enemy jamming efforts and provide a smoother transition to MILSTAR--the next generation satellite system.

We are currently installing AFSATCOM terminals in strategic bombers, reconnaissance and surveillance aircraft, ground and airborne command centers, and missile launch control facilities. The installation of these terminals will be virtually completed by December 1983. In addition, the Army and Navy are also acquiring terminals for their own systems. Our Fiscal Year 1984 request includes procurement funds for an AFSATCOM communications package to be integrated on a host spacecraft to ensure continuity of communications in critical geographic areas.

SDS provides one of the major host satellites supporting the AFSATCOM system. It provides critical two-way transpolar command and control communications for our nuclear capable forces. SDS also supports a data communications network among remote tracking stations and the STC for command and control of our satellites. Our Fiscal Year 1984 RDT&E program will complete the development of a Shuttle-compatible SDS spacecraft, and our procurement program is designed to sustain our capability to launch satellites to replenish the SDS orbital constellation.

In Fiscal Year 1984, we will continue to develop the new satellite communications system called MILSTAR to replace AFSATCOM. MILSTAR will fulfill the urgent need for highly jam-resistant and survivable satellite communications, and will feature increased jam resistance by using extremely high frequency (EHF) communications and increased survivability through a variety of techniques. It is a joint Army/Navy/Air Force program which will support both strategic and tactical users.

The E-4 and EC-135 aircraft are survivable extensions of the fixed command centers which provide higher confidence in our ability to manage our strategic forces during a nuclear war. In Fiscal Year 1984 we are continuing development of several major improvements in our Airborne Command Post equipment. These include increased capabilities for the E-4B super high frequency (SHF) and EC-135 UHF satellite communications terminals, as well as continuing our work on improving the Minimum Essential Emergency Communication Network (MEECN) low frequency and very low frequency (LF/VLF) system. Development also continues on the improved communications processing, electromagnetic pulse (EMP) testing, and terminals for the Integrated Operational NUDET Detection System (IONDS). These systems are being developed so that we will be able to maintain connectivity and communications in the high threat environment of the future. We are designing these systems to have, among other features, antijam capabilities so that they will be able to support operations in a nuclear environment over extended ranges for prolonged periods of time. Our Fiscal Year 1984 aircraft modernization portion of the C^3 improvement program includes procurement funds for installing upgraded automatic data processing equipment which will improve the E-4B battle staff's ability to provide critical and time sensitive information to the NCA. Procurement funds have also been requested to harden selected systems on the EC-135 against nuclear effects, to provide a satellite secure voice conferencing capability, and to add new Communications Security (COMSEC) units on the E-4B to support the NCA connectivity.

Another major program to improve the reliability and endurance of our strategic communications is the Groundwave Emergency Network (GWEN). The GWEN system will be a grid of unmanned, EMP hardened relay nodes operating in the LF band. This effort is a part of the MEECN program to improve its LF/VLF capabilities. Network terminals will be located at major command centers, warning sensor sites, and force element command posts. These terminals will have the capability to support two-way data communications in a nuclear environment. In Fiscal Year 1985 we will complete GWEN development activities and planning will begin for the final operational capability.

Under the SAC Communications program, we are developing the SAC Digital Network (SACDIN) and Aircraft Alerting Communications EMP (AACE) upgrades. SACDIN modernizes SAC's existing C^3 data system, which is aging and has insufficient capacity. SACDIN objectives are to provide responsive, two-way, secure command and control information between SAC Headquarters and subordinate commanders. The system, in addition to providing greater survivability, will also feature increased flexibility and growth capacity. In Fiscal Year 1984, we will continue the SACDIN field test and IOT&E and begin production, installation and transition.

In order to provide EMP protection for emergency action communications equipments, the AACE upgrade program will provide shielded enclosures for selected equipment at SAC main operating bases in the CONUS. The screen rooms and associated interface consoles will also protect the communications equipment used to relay critical action messages from the command post to bomber crews in the alert facility or in the cockpit. AACE development will continue in Fiscal Year 1984 and initial site surveys and installation will begin.

Our MEECN VLF/LF Improvements project provides for improved dissemination of war orders via the secure VLF/LF system. In Fiscal Year 1984 we will continue the development of a VLF/LF miniature receive terminal (MRT) for bomber aircraft. The bomber receiver will provide a high confidence strategic communication link for the B-1B, B-52G, B-52H and FB-111 aircraft. In addition to these VLF/LF improvements, the MEECN adaptive high frequency (HF) communications program will provide a modular family of radios which will improve the reliability of two-way communications in a nuclear or jamming environment. In Fiscal Year 1984, full scale development of the near term modifications and the modular radio family will continue.

TACTICAL C^3

Our existing tactical C^3 systems also have a number of critical deficiencies which require correction. Chief among these is their susceptibility to enemy jamming.

The Air Force relies heavily on C^3 to intensify forces at the most urgently needed battle locations. C^3 also allows coordination of heterogeneous force elements. Jamming communications links causes degraded battlefield performance that results in losses of both men and material. Accordingly, we are taking action to add jam resistance to our existing tactical C^3 networks.

In Fiscal Year 1984 our Advanced Communication Systems program develops and implements jam-resistant air-to-air and air-to-ground UHF and Very High Frequency (VHF) communications which can survive in the extensive communications jamming environments of the present and the future. We are now deploying the HAVE QUICK system to provide a near-term jam-resistant UHF capability. While we intend to improve this low cost system to ensure its viability as long as practical, it is clear that HAVE QUICK can be and ultimately will be defeated --based on technical jamming approaches which are now available to us.

Because recent exercises have shown that the effectiveness of our tactical forces can be significantly degraded if our voice communications are jammed, we are developing a more advanced technology program, HAVE CLEAR, for the long term. HAVE CLEAR will be less sensitive to evolving jamming technologies and will, therefore, defeat the projected long term jamming threat.

To provide for jam-resistant VHF communications, the Air Force is participating in the development of the Army's Single Channel Ground and Airborne Radio System VHF (SINCGARS-V) program. This effort will ensure Air

Force interoperability with Army, Navy and Marine Corps air and ground forces.

In addition to jamming susceptibility, other major deficiencies of existing tactical C^3 systems include delays in passing time-critical information through communication system nodes and the lack of common reference points to coordinate the tactical air battle. Although much combat information is suited to voice communications, aircraft controllers and voice links can become saturated when voice is relied upon as the sole means of real-time communications. Studies show that certain elements of data are passed more efficiently over digital data links.

The Joint Tactical Information Distribution System (JTIDS) will correct these deficiencies. JTIDS provides jam-resistant, secure communications between force elements using a digital data link which allows command and control systems to share and exchange more information. In Fiscal Year 1984 we will continue depot support equipment development for the E-3A and ground JTIDS terminals, fighter terminal/F-15 integration development and Tactical Digital Information Link (TADIL)-J conversion development and testing. Production funds for JTIDS are included in the weapon system program budget requests.

The tactical communications resources which support the Tactical Air Forces are old and lack adequate capacity to support traffic handling needs. To provide the minimum essential C^3 to support deployed tactical forces, major improvements are needed for the equipment assigned to Air Force Combat Communications and Tactical Air Control System units. In support of this need, we will continue to work with the Army to develop secure, jam-resistant, digital communications equipment through the Joint Tactical Communications program (TRI-TAC).

The E-3A aircraft provides mobile, survivable and jam-resistant wide area radar surveillance, along with highly sophisticated data processing, data relay, and secure communications capabilities. We are currently producing a U.S./NATO standard configuration E-3A, which integrates JTIDS, a maritime capable radar, and a larger computer into the basic Core E-3A. In Fiscal Year 1984, we will continue development and testing of C^3 improvements such as additional radios and consoles. In addition, we will continue validation of the improved Radar Data Correlator, development of mission simulator improvements, and we will define needed maritime and supplemental surveillance systems improvements.

The current Tactical Air Control System (TACS) was deployed in the late 1960s and early 1970s and because of aging and obsolescence, is nearing the end of its useful life. The Air Force has joined the existing Marine Corps Tactical Air Operations Central (TAOC)-85 program to develop the Modular Control Equipment (MCE). In Fiscal Year 1984 we will continue to develop the MCE in order to upgrade the Air Surveillance and Control component of the TACS. This joint program will enhance the TACS survivability, mobility, and ability to handle the greatly increased C^3 work loads required in a modern combat environment. Some of the advantages in joining the Marine Corps program include: avoiding about $40 million in RDT&E cost, achieving an early 1986 IOC, enhancing Service interoperability, and reducing procurement and life cycle costs.

We continue to work with the Army in the development of the Joint Tactical Fusion program. This program will develop and acquire critically needed automation equipment and facilities for processing, analyzing, and disseminating intelligence data in support of the tactical commander.

DEFENSE-WIDE C^3

Major programs in Defense-Wide C^3 include the Defense Satellite Communications System (DSCS), COMSEC equipment, and Advanced Space Communications. The DSCS is an evolutionary DOD system developed to provide SHF satellite communications for secure voice and high data rate transmissions. The DSCS provides unique and vital national security communications for worldwide military command and control, crisis management, intelligence and early warning data relay, treaty monitoring and surveillance information, and Presidential and diplomatic traffic.

In Fiscal Year 1984 our remaining DSCS RDT&E task is to continue the development and testing of the DSCS III satellites, as well as to develop product improvements for follow-on DSCS systems as they continue to evolve. DSCS III will provide increased capacity, flexibility, and ECCM capability. In support of strategic forces, the DSCS will also include a UHF/SHF capability for emergency war order dissemination and force execution commands. The DSCS procurement program provides for replacing DSCS II satellites with DSCS III. We procured two DSCS III satellites Fiscal Year 1982 and two in Fiscal Year 1983. In Fiscal Year 1984, we intend an advance procurement of parts for four additional DSCS III satellites.

COMSEC equipment prevents an enemy from exploiting our communications, receiving our telemetry data during weapons testing, interfering with the control of our spacecraft, or intercepting data or communications during wartime. In Fiscal Year 1984, we will continue our COMSEC programs, and equipment procurement programs to meet our security requirements.

In the Advanced Space Communications program we are developing the concepts, techniques, and advanced technologies for military satellite communications systems capable of surviving in the intense electromagnetic jamming environments expected in the future. In Fiscal Year 1984 our activities include efforts in laser communications and efforts in the advanced airborne terminal and satellite technologies we will require for jam-resistant operations. Several of these projects are developing the technologies needed for future improvements to the MILSTAR and DSCS III systems.

OSD has designated the Air Force as lead service for all DOD Microwave Landing System (MLS) activities. DOD aircraft must interoperate with internationally standardized navigation and landing systems. MLS will be a common civil/military system for precision landing. In Fiscal Year 1984 Traffic Control/Approach/Landing System RDT&E funds for MLS will be used to initiate development and test of a modular tactical ground system for Air Force/Army use and to integrate civil air carrier quality avionics into MAC C-141 and C-130 aircraft.

VI. MANAGEMENT, SUPPORT, AND DEFENSE-WIDE SYSTEMS

The programs which enhance and increase the effectiveness of our military forces fall into three categories: Management, Support, and Defense-Wide Systems.

MANAGEMENT

One of our most important priorities is people. The Air Force men and women, both military and civilian, provide the positive force to effectively manage the acquisition of today's highly technical systems.

The central budget program in this management category is Acquisition and Command Support (ACS) in the RDT&E appropriation. This program provides the manpower resources for the program management function, technical mission, and base support functions at the six Air Force Systems Command activities--the Aeronautical Systems Division, Electronic Systems Division, Aerospace Medical Division, Armament Division, Ballistic Missile Office, and Space Division.

ACS funds pay for the scientists, engineers, managers, administrative specialists and support personnel who conduct the RDT&E and acquisition of our weapons systems. It is extremely important that our program offices are adequately manned with quality people to ensure our programs and contracts are managed efficiently. Cost control and sound program management is achieved by dedicated, competent people--people who deserve our confidence and support.

Our management programs also fund the facilities maintenance, supplies, equipment, rent, utilities, contractual services and other expenses in direct support of these six headquarters' organizations and their people.

Our Fiscal Year 1984 budget request is the absolute minimum ACS funding required to guarantee adequate program office manning, proper program oversight and contractor/government interface, and technical/scientific continuity at our product divisions.

SUPPORT

Test and evaluation is an important step in the system acquisition process. Well planned testing and evaluation minimizes risks, identifies problems, allows for timely correction, and reduces deficiencies and failures in fielded equipment and systems. The programs in this support category fund the operation of over 30 Air Force development test centers and ranges, as well as the development of new equipment to conduct test and evaluation and training at these centers and ranges.

The Test and Evaluation Support program funds the base operating functions and test and evaluation activities at Eglin AFB, Florida, Arnold AFS, Tennessee, and Edwards AFB, California, as well as the test and evaluation activities at the 4950th Test Wing, Wright-Patterson AFB, Ohio. These facilities not only support Air Force programs, but also the programs of the other services and government agencies, such as NASA and the Federal Aviation Agency.

Today, the development and operational testing of our modern weapon systems and subsystems is hampered by older, less efficient test equipment and facilities. Modernized facilities and equipment improve the quality of testing, promote greater productivity, and reduce test costs. It is, therefore, important that we pursue much needed improvements to our test capabilities.

The Improved Capability for Development Test and Evaluation program consolidates all of the major Improvement and Modernization (I&M) projects at the development-oriented test centers and ranges. I&M projects were initiated and funded through Fiscal Year 1982 in the Test and Evaluation Support program. We separated the I&M efforts from the base operating effort in Fiscal Year 1983 to provide better management visibility and control.

For Fiscal Year 1984, efforts include several important projects to support the Peacekeeper, the Trident II, the B-1B flight tests, and a project to improve our data processing capability at the Air Force Flight Test Center. The program also includes the continuation of a project which provides for the activation of the Aeropropulsion Systems Test Facility (ASTF) at the Arnold Engineering Development Center. ASTF, currently under construction, will be a national asset for integrated aerodynamic and propulsion testing of turbine engines. Fiscal Year 1984 funds will be used to complete ASTF check out and conduct initial operational testing after construction is complete.

The Range Improvement program funds the development and improvements to Soviet threat radar systems and range instrumentation used for Air Force aircrew training, weapons testing and tactics evaluation. In Fiscal Year 1984, in the Range Improvement program, we will begin development of a Soviet threat radar, and begin procurement of modular threat emitters, ground jammers and instrumentation for drone control.

An experienced aircrew's chance of survival increases dramatically after the first few combat missions. Therefore, we are trying to increase the probability of survival in combat by simulating those early missions in a realistic training environment. In addition, we also need a realistic environment to test and evaluate weapon systems. In Fiscal Year 1984, the Range Improvement Program will continue to develop threat radar systems to simulate the combat arena, instrumentation to provide aircrew feedback on mission performance, and data collection for test and evaluation.

The Aerial Target program provides targets to evaluate new air-to-air weapons systems, develop and test new tactics, and provide realistic training. In Fiscal Year 1984, RDT&E funds will be used to complete IOT&E of our latest aerial target, the Firebolt, which will simulate anticipated, future threats. Procurement funds will continue the buy of existing aerial targets such as the MQM-107B and the QF-100 needed to simulate present threats.

DEFENSE-WIDE SYSTEMS

The programs in Defense-Wide Systems are those which support more than one defense mission. Our major efforts include three programs: aircraft engine development; the T-46A Next Generation Trainer (NGT) program; and, the Modular Automatic Test Equipment (MATE) program. In addition, we have programs to accomplish common aircraft modifications.

There are three separate programs relating to aircraft engine development: Engine Model Derivative Program (EMDP); Aircraft Engine Component Improvement Program (CIP); and, Alternate Fighter Engine. EMDP provides a mechanism to incorporate advanced technology into current inventory engines to achieve significant durability, reliability, and/or performance improvements. Previously, when the Air Force needed a derivative engine, it proceeded directly into a full scale development program. The EMDP represents a more timely, less risky approach to meeting near-term propulsion system needs. In Fiscal Year 1984 we will continue the F100 EMDP to demonstrate the durability of the engine at 4,000 tactical cycles and the operability improvements of the engine within the F-15/F-16 flight envelopes at the higher thrust level of the derivative engine.

Aircraft engine CIP identifies solutions to service-revealed difficulties and cost of ownership problems. Experience shows that it is impossible to identify or solve all engineering problems during the engine qualification process. Some problems emerge only after years of operational service. The CIP is, therefore, a critical part of the engine acquisition and management process. Furthermore, past CIP efforts have demonstrated large cost avoidance payoffs, such as the TF41 engine high pressure turbine blade CIP for the A-7 aircraft, which will save an estimated $170 million over a ten year period. In Fiscal Year 1984 we will continue with an aggressive CIP to enhance Air Force operational readiness, maintain required performance, and ensure acceptable cost of ownership.

The Alternate Fighter Engine program provides for the competitive development of more durable/supportable engines for the F-16 and F-15 engine procurements in the late 1980s and early 1990s.

The acquisition strategy included in the Fiscal Year 1984 budget request calls for continuing full scale development of the F110 (formerly F101 Derivative Fighter Engine) and the F100 Digital Electronic Engine Control (DEEC) so that we can compete these engines for acquisition in the mid-1980s. This competitive strategy could include engines for F-16 C/Ds, F-15 C/Ds, derivative aircraft, or any combination, as well as engines in support of the Navy's F-14 modernization program. Since no system performance deficiencies have been identified based upon engine thrust-to-weight, the Pratt & Whitney F100, with DEEC and the improved life components available from CIP, will compete with the General Electric F110, with competition focused on improved supportability, operability, availability, overall life cycle cost and the contractor's willingness to warrant his product. Thrust in excess of that currently available in the F100 is not a factor in this competition.

Thus, our Fiscal Year 1984 request funds the F110 to provide an engine qualified for production and it also funds enhancements for the F100 for increased durability, increased operability, and decreased support costs. This will allow for these engines to compete in an even-handed manner according to an acquisition strategy that has been carefully tailored to protect the integrity of the competition. As we view the increased buy of F-15 and F-16 in various configurations and the need for a competitive environment in high thrust fighter turbine engines, we see a great opportunity to obtain better, more reliable engines at lower life cycle costs through the pressure of competition.

The Alternate Fighter Engine program for Fiscal Year 1984 is the critical link in sustaining the Air Force and Congressional emphasis on competition in fighter engines. Without sufficient funding to complete the development of the F110 and the DEEC for the F100, the competitive environment we are attempting to foster will, to a large extent, disappear.

The T-46A Next Generation Trainer (NGT) will replace the aging T-37 as our primary jet trainer in the Air Training Command. The T-46A is a twin turbofan jet engine aircraft with significant improvements in performance and maintainability over the T-37. The most significant changes will be a much needed anti-icing capability, advanced turbofan engines for reduced fuel consumption, and a pressurized cockpit for greater training flexibility. In addition, the T-46A will provide reduced operating costs, greater range and endurance, and will be equipped with more comprehensive instrumentation. Acquisition of the T-46A will ensure the Air Force can sustain its pilot production without reductions in quantity or quality. Full scale development of the T-46A began in July 1982. In Fiscal Year 1984 engine DT&E and fabrication of test aircraft will continue.

Aircraft availability in support of force readiness has suffered because of malfunctioning test equipment at all maintenance levels. The MATE program addresses this problem and will provide effective automatic test equipment (ATE) at the lowest possible life cycle cost through the use of a standardized acquisition management process and modular ATE hardware and software. Our Fiscal Year 1984 effort continues the full scale development of the MATE system, while delivering automatic test systems to support depot avionics work loads and inertial navigation systems.

Finally, our multiaircraft modification program represents a broad range of modifications that are not unique to a particular weapon system. They are designed to maintain present capability, improve performance, and/or lower support costs. An example is a modification to replace HF single side band radios in selected aircraft over several years. Another modification replaces high and low altitude radar altimeters in various aircraft with a combined altitude version, resulting in improved reliability and maintainability and reduced support costs.

VII. READINESS AND SUSTAINABILITY

In our Fiscal Year 1984 budget submission, we continue to place priority emphasis on improving the combat preparedness and staying power of our forces. Investments in readiness and sustainability will assure that our forces are ready for combat on short notice and capable of sustained military operations.

This section discusses simulators, aircraft and missile spares and repair parts, war consumables, aircraft common ground equipment, and represents only some of our readiness and sustainability needs. Additional requirements, such as ammunition, bombs, bare base equipment, vehicles, fuel, other procurement equipment spares and repair parts, and military construction are reflected in other appropriations.

Also, this section does not represent a unique mission area. The costs associated with the items discussed herein are included in the mission areas they support.

SIMULATORS

Achieving a high state of mission readiness through improved training is the primary objective of the Air Force Flight Simulator program. The most important return we expect from modern simulator investments is to attain combat mission readiness through training in a more efficient and effective manner. However, simulation is not a substitute for, but a complement to, actual "in-flight, hands-on" proficiency training.

Simulation can improve flying training efficiency by allowing pilots to develop specific skills through repetition and by concentrating their efforts in a particular area. Flight safety is also enhanced by allowing the pilot to practice hazardous or restricted maneuvers which are not allowed in the aircraft. This type of emergency and high risk training in the simulator is of tremendous value. The correct application of instrument and emergency procedures depends heavily on crew coordination which can be effectively taught in simulators.

Use of simulators increases aircrew performance in an actual weapon system. This is accomplished by exposure to a realistic threat environment and an ability to practice actual combat tactics--some of which are prohibited in peacetime. As simulators have come into greater use, the prospects for extension of airframe life has been an additional benefit.

With the right combination of flight simulators and aircraft, we intend to: maintain and improve the combat readiness of experienced aircrews; provide effective initial and continuation training for other less experienced pilots and aircrew members; reduce training and operating costs; and conserve scarce resources such as energy, weapons, and ammunition. We believe that the proper mix of flying hours and simulator time will result in more proficient aircrew members. Under wartime conditions those crew members should have lower airframe and aircrew loss rates. This is an economy that the Air Force cannot afford to pass up.

We have many simulators now in the field, including those for the F-15, A-10, C-5, B-52, C-130, C-141, KC-10, E-3, T-37, KC-135 and T-38. These have varying degrees of capability. We have funds programmed in Fiscal Year 1984 to continue to procure OFT simulators for the F-15 and F-16. Also in Fiscal Year 1985, we plan to initiate procurement of the C-5/C-141 Aerial Refueling Part Task Trainers. The Air Force expects to continue its flight simulator procurement program for new systems such as the B-1B, and the T-46A. We are also initiating efforts to upgrade existing systems in the field to extend their useful lives and improve their supportability.

AIRCRAFT AND MISSILE SPARES AND REPAIR PARTS

Adequate funding of aircraft and missile spares is vital to peacetime readiness and wartime sustainability. Our aircraft program consists of two distinct elements--initial spares and replenishment spares.

Initial spares are items peculiar to a weapon system being introduced for the first time and includes items required to support the procurement of new aircraft, modifications to aircraft, aircraft support equipment, and spare engines. The amount of funds required for initial spares is directly related to the magnitude of the weapon systems and modification programs being introduced. Included are spare parts, engines, and modules for the F-15/F-16 fighters, the cornerstones of our tactical forces. In addition, our Fiscal Year 1984 request includes emphasis on the B-1B, the Peacekeeper and C-5B programs.

Replenishment spares are required to provide continuing support for the life of our weapons systems. We segment our replenishment spares into three categories--Peacetime Operating Stock (POS), War Readiness Spares Kits/Base Level Self-Sufficiency Spares (WRSK/BLSS), and Other War Reserve Materiel (OWRM). The POS supports peacetime training and forms the baseline of spare parts from which the Air Force transitions into war. WRSK/BLSS spares support the initial wartime surge, while OWRM spares provide wartime sustainability until industrial production can sustain wartime operations.

During the late 1970s, a period of constrained DOD budgets, the introduction of new aircraft weapon systems was accomplished at the expense of fully funding our replenishment spares account. Shortfalls existed, and the impact on military operations increased significantly. As new assets entered the inventory, our replenishment spares requirement began to grow. At the same time, inflation and lower weapon system quantity buys caused the price of replenishment spares to spiral upward. As a result, funds programmed for replenishment spares in the early 1980s became inadequate because of both the growth in requirements and the growth in weapon system prices. Between 1981 and 1983, we began to shift our emphasis from procurement to improving readiness and sustainability.

In August 1982, however, an aircraft replenishment spares problem, attributable to a significant growth in requirements, surfaced. Because of this growth, we initiated an analysis of our requirements projections and budgeting methods. We are just completing that analysis which will resize our replenishment spares shortfall through Fiscal Year 1984. We do believe that our replenishment spares budget request in Fiscal Year 1984 represents a balanced approach between modernization and improvements to readiness and sustainability. We are improving our methods of predicting future spares requirements. With this budget request, we expect to make progress toward correcting our previous spares shortfalls as we progress toward achieving the full combat potential of our aircraft weapon systems.

Our missile spares and repair parts have received an adequate level of funding in the past several years, and as a result, we have continued to enjoy high mission capable rates in the missile program. Continued Congressional support is vital to the progress we have made in upgrading logistics support to our missile forces and maintaining high missile capable rates.

WAR CONSUMABLES

The War Consumables program provides such things as external fuel tanks, bomb racks, adapters and pylons. They are procured as replacements for those items jettisoned from aircraft under wartime conditions. Half of the funds in this year's request are for F-16 external fuel tanks. These tanks are used to extend the range of the basic airplane for long range missions. When carrying these tanks, the maneuverability of the basic airframe, is reduced and its drag increased. For combat, to restore the higher maneuverability and lower drag of the basic airframe, the external tanks will have to be jettisoned.

Two different tanks are being procured, a 300 gallon fuselage tank and a 370 gallon wing tank/pylon. Both tanks are being procured on multiyear contracts, and Fiscal Year 1984 will be the third year of both multiyear contracts. The remainder of the request is for F-16 bomb racks, Maverick and HARM missile launchers, F-4 external fuel tanks, and OV-10 fuel tanks. All programs are structured to meet the minimum outyear sustainability goals identified in the Defense Guidance.

AIRCRAFT COMMON GROUND EQUIPMENT

The Common Ground Equipment program is a key factor in the overall readiness and sustainability posture of our air forces. It provides those items necessary to maintain, service, and test aircraft and their components. These items are used throughout the Air Force logistics complex--on the flight line, in base maintenance shops, and at the centralized maintenance activities.

Approximately 50 percent of our Fiscal Year 1984 budget request provides equipment for new aircraft entering the inventory. The remaining portion of the request is for equipment replacement--changed requirements as a result of aircraft modifications, and WRM build-up to support Rapid Deployment Force (RDF) objectives.

VIII. TECHNOLOGY BASE

Technology Base (TECH BASE) programs include the basic research, exploratory development and advanced technology development supporting the attainment of new knowledge and ideas in the areas of electronics, weaponry, propulsion, flight vehicles, people, materials, and environment. We pursue these programs through a cooperative network of Defense Department, other government agencies, industry, and university scientific and engineering personnel.

Historically we have relied on a technological, rather than a numerical, advantage to maintain the superiority of U.S. military weapon systems over Soviet systems. Investments in TECH BASE have contributed directly to the evolutionary and revolutionary growth in our military capability. The qualitative advantage of our present combat capability over that of the Soviets is a direct consequence of the TECH BASE investments we made ten to twenty years ago.

But our current qualitative advantage is eroding because of several factors: from 1972 through 1981 the Soviets invested some $135 billion more than the United States in military RDT&E; because of the effects of inflation, the buying power of our investments in research and exploratory development declined by some 40 percent between 1966 and 1981; over this same period, the Soviets graduated four to five times more engineers and scientists than the United States; and through overt and covert means, the Soviets have been exploiting Western technology for use in their expanding military forces. Recent trends show an alarming shift to the advantage of the Soviets in an increasing number of basic technologies, such as the application of charged particle beams and high energy lasers, chemical warfare, antisatellite, and others. The Soviets already have a quantitative advantage--we cannot allow them to gain a qualitative edge.

We are taking several actions to counter this shift and maintain our technological superiority and qualitative edge over the Soviets. First, in Fiscal Year 1984 we are requesting a modest real growth increase in our TECH BASE program, and we expect to continue this increase over the next several years. Second, we are developing career incentives to attract and retain a sufficient number of scientific and career officers, including monetary stipends for officers in critical career specialties, such as engineering. Third, to derive the greatest return on the dollars we invest in our TECH BASE programs, we are also initiating several management initiatives.

In a major organizational move, we are restructuring Air Force laboratory management by assigning the laboratories to the System Product Divisions, closely aligning technology areas with weapon system types. We have recently assigned the Air Force Wright Aeronautical Laboratories at Wright-Patterson AFB to the Aeronautical Systems Division, also at Wright-Patterson AFB. We have realigned the Air Force Rocket Propulsion Laboratory, Air Force Geophysics Laboratory, and Air Force Weapons Laboratory under the new Space Technology Center, which, in turn, reports to the Space Division in Los Angeles. Two other laboratories, Rome Air Development Center and the Air Force Armament Laboratory, were already assigned to System Product Divisions. The Air Force Human Resources Laboratory will soon be assigned to the Aeromedical Division. This restructuring is designed to enhance the laboratory-to-customer, and technology-to-system relationship, thus improving the capability of technology responding to the requirements of the operational user. The result should be a more tightly focused TECH BASE program, more efficient use of limited TECH BASE dollars and manpower, and a quicker and smoother transition of appropriate technology into system development.

We are also working within the DOD on devising long term planning methods to identify future technologies to support next generation military systems, and we are studying new approaches to improve overall TECH BASE management within the Air Force.

MAJOR TECHNOLOGY BASE PROGRAMS

The Fiscal Year 1984 TECH BASE budget request represents a minimum essential program screened from a greater number of proposed technology efforts. The following paragraphs briefly describe some of our high payoff technology programs in terms of seven functional areas--Electronics, Weaponry, Propulsion, Flight Vehicles, People, Materials, and Environment. Also, because of their growing importance to our national defense, some of our more important space technology efforts are described at the end of this section.

ELECTRONICS

Integrated circuit technology is the keystone of modern military electronics. The Very High Speed Integrated Circuits (VHSIC) Tri-Service program provides the technology for the next two generations of integrated circuits. VHSIC will have a very high data processing capability for a wide range of military systems. Initial application will be digital signal processors for radar, antisubmarine warfare, communications, missile guidance, electronic warfare, and optical sensor systems. Payoffs will include enhanced performance and reliability and reduced life-cycle cost. By Congressional direction, the program is centrally managed in the Office of the Under Secretary of Defense for Research and Engineering, and the Air Force budgets for and administers the total program funding. In Fiscal Year 1984 we will continue intensive efforts in the application of VHSIC technology to meet specific system needs.

Our Command, Control and Communications program provides a broad technology base for advancing Air Force mission capabilities. Efforts include improving the effectiveness and survivability of C^3 systems, obtaining ultra reliable, secure global communications, improving range and detection capability against new threats in ground, airborne, and space-based radars, improving the timeliness and quality of intelligence warning data and decision making, and increasing the availability of operational systems. One of the Fiscal Year 1984 efforts within our surveillance technology project is the Advanced Airborne Surveillance Radar--a next generation E-3A radar.

Also in our Command, Control and Communications program in Fiscal Year 1984, we will pursue a major technology thrust in the emerging discipline of artificial intelligence (AI) by applying the digital computer to human tasks which require deductive or inductive reasoning. AI will have impacts across many mission areas, but high payoff military applications are particularly expected in automated fault diagnosis to assist our maintenance technicians, and in automated decision aids for our battlefield commanders.

In Fiscal Year 1984 we are continuing development efforts in the Advanced System Integration Demonstration (PAVE PILLAR) program, a new approach to the design and acquisition of avionics. The PAVE PILLAR program will exploit a number of recent innovations in systems architecture, semiconductor technology, computer standardization and computer software to integrate and automate avionics functions for future aircraft. Objectives include operational performance improvements, very high mission reliability, fault tolerance, substantial reductions in both acquisition and support costs and reduction in crew work load in dense threat environments.

To establish a capability to successfully contend with the threat postulated for the mid-to-late eighties, our forces require significant improvements in the performance provided by aircraft avionics. The Advanced Avionics for Aircraft program is the principal Air Force source of advanced technology for avionics that accomplishes the navigation, target acquisition, weapon delivery and fire control functions. One of the major efforts in Fiscal Year 1984 is the development of a solid state phased array radar with improved performance, higher reliability and reduced size and weight.

Modern, fast moving battle conditions require the capability to rapidly update reconnaissance information. The

Avionics programs and the Reconnaissance Sensors/Processing Technology program are addressing this requirement. Technology advancements are being made in infrared imaging sensors which will double the range and resolution over current sensors and provide a significant improvement in our day/night/adverse weather reconnaissance and strike capability. Additionally, advancements are being made in real-time target detection, location and classification using on-board processors. New radar technology is also being pursued which will provide an improved all-weather reconnaissance capability and enable detection of military targets hidden by foliage or camouflage.

In a combined effort under the Avionics programs and the Combat Identification Technology program, we are continuing in Fiscal Year 1984 technology advancements to significantly improve long-range target identification. These technology advancements include improved long-range sensors, better methods to collect, analyze and identify radio frequency (RF) emissions from target aircraft, and automatic processing of information from multiple sources to provide a single, high confidence, friend or foe declaration to the pilot.

As the Soviet threat advances up the frequency spectrum, we are keeping pace by developing the technology to provide warning and countermeasures. Our Fiscal Year 1984 request includes development and test of advanced warning systems, chaff, and jammers.

In the area of Electronic Counter Countermeasures (ECCM), we are developing techniques to make the radars on our fighter aircraft immune to enemy jamming. Systems being developed in the Aerospace Avionics and Counter Countermeasures Advanced Development programs will enable attack aircraft to find their target despite battlefield optical decoys and obscurants.

WEAPONRY

We are continuing our intensive development of the technology base for high energy laser weapons--the first of the new class of potentially revolutionary directed energy weapons. We are emphasizing the longer range applications which exploit the laser weapon's potential for delivering destructive energy over long ranges with negligible time-of-flight. Several key programs to demonstrate the technology for longer range applications are underway.

In our Advanced Radiation Technology program, fabrication of the first cylindrical chemical laser device and its unique conical and toric mirrors is nearing completion. This will be the pioneering demonstration of the cylindrical laser technology that is essential for scale-up of chemical lasers to the high power levels required for long-range applications--both airborne and space-based. In addition, we will continue the Airborne Laser Laboratory Test program --the first demonstration of the feasibility of airborne laser weapons.

Our technology efforts are directed toward developing weapons at an affordable cost which produce the maximum damage. For example, in Fiscal Year 1984 there is a technology demonstration program for the hypervelocity missile which will demonstrate the viability of guiding the missile to the target using a laser guidance system which transmits guidance commands from the aircraft to the missile. The potential savings of a weapon system where the guidance unit remains on the aircraft are significant.

We are also actively pursuing the technology for an autonomous acquisition capability for air-to-surface weapons. This system would be programmed to recognize distinguishing target characteristics, and would provide us a significantly improved capability to attack key hard targets with high accuracy while remaining outside of the target area defenses.

The Conventional Weapons Technology program includes all Air Force advanced development effort for technology base demonstrations of advanced nonnuclear aircraft armament and weapons guidance technology. Work on the Low Altitude Delivery (LAD) vehicle will continue in Fiscal Year 1984 with demonstrations of propulsion and an inertial guidance platform allowing standoff launch range to be increased beyond lethal defense zones. These technologies provide the capability to deliver submunitions to close runways, defeat armored columns, and accomplish defense suppression missions.

The Air Force technology base Conventional Munitions program supports tactical air-to-surface and air-to-air guided weapons development. In Fiscal Year 1984 development efforts include design and feasibility demonstrations of advanced air-delivered munitions, including cluster munitions, warheads, fuzing, and target-activated munitions. The program also supports advancement of the state-of-the-art in aircraft guns, rockets and ammunition.

The Advanced Weapons program develops the technology base for advanced weapons and their adaption to Air Force systems. Studies and experiments will continue in Fiscal Year 1984 in laser applications, survivability and vulnerability, advanced weapon concepts, the nuclear weapon environment, civil engineering technology and environmental quality.

PROPULSION

Emphasis in turbine engine technology continues to stress improved durability, while maintaining an active core performance program. Air Force advanced engine development is concentrated in two complementary programs--Advanced Turbine Engine Gas Generator (ATEGG), in which we assess and test advanced turbine engine core components (the high pressure section of the engine), and Aircraft Propulsion Subsystem Integration (APSI), where we integrate engine cores from ATEGG with other advanced components (such as fans, low pressure turbines, augmentors and controls), to test technology demonstrator engines. With continuing efforts in Fiscal Year 1984, these programs will pave the way for turbine engines that will be smaller, more powerful, more efficient, much more durable, and lower in life cycle cost.

Our Rocket Propulsion program provides new concepts and techniques in rocket propulsion and space technology to improve air-launched tactical and strategic missiles, space launch systems, satellites and ballistic missiles. This program also provides technology with high performance payoffs for solid propellant motors, liquid rocket engines, and electrical thrusters. In Fiscal Year 1984, we will continue work on radial pulse motors, which should provide advantages for air-launched strategic missiles and antisatellite systems. To advance space system propulsion, we will begin development of an improved satellite attitude control system for greater maneuverability and survivability, and modular/storable propulsion systems.

Finally, our Aerospace Propulsion program develops propulsion and power technology in support of current and future aerospace vehicles and weapon systems. Exploratory development and evaluations are continuing in Fiscal Year 1984 in the areas of turbine engines, ramjet engines, fuels, lubricants, and fire protection technology, as well as aerospace power generators, distribution and control technology.

FLIGHT VEHICLES

A major goal of our research and technology is to improve aircraft performance. A key program in our Fiscal Year 1984 request is the Advanced Fighter Technology Integration (AFTI) program. AFTI consists of three demonstration projects--Fighter Attack Technology, Mission Adaptive Wing, and Short Takeoff and Landing Fighter Technology.

Fighter Attack Technology integrates into the AFTI/F-16 testbed advanced aeronautical technologies, digital flight control, and improved pilot/vehicle interface for enhanced survivability and weapon delivery accuracy. The Mission

Adaptive Wing integrates advanced structures and an automatic control system for a smooth skin, variable camber wing to extend range and expand the flight envelope in all flight regimes. The Short Takeoff and Landing Fighter Technology project is a crucial facet of our program to reduce dependence on conventional runways. Using a variety of advanced technologies, we will demonstrate ways to greatly reduce takeoff and landing distances without degrading aircraft range, payload or speed.

Our Flight Vehicle Technology program will investigate and develop new technologies in enhanced flight control and weapons delivery systems, systems for increased aircraft fuel efficiency and range, and systems for increased aircraft survivability and safety. In Fiscal Year 1984, we are conducting a multiagency project, Atmospheric Electricity Hazards Protection. The increased use of microelectronic subcomponents and composite structural materials will increase the vulnerability of future flight vehicle systems to electrical transients from lightning and static electricity. This multiagency project will develop a technology to prevent these factors from limiting future military operations, especially in the low altitude, and in the adverse weather combat arena.

Finally, our Aerospace Flight Dynamics Exploratory Development program in Fiscal Year 1984 provides for the continuing design and development of future aerospace vehicles, including aircraft, missiles and spacecraft and for the improvement of current vehicles. It encompasses the technical areas of structures, aerodynamics, aerothermodynamics, flight performance analysis, vehicle dynamics, flight control, crew station design, crew escape and recovery, environmental control, mechanical subsystems, survivability/vulnerability and technology integration.

PEOPLE

People are our most important resource. While the technology content of our weapons systems increases, skilled manpower decreases. Consequently, we must continue to develop new systems, methods and procedures to ensure the most effective performance of our people. Two of our exploratory development programs in this area are Aerospace Biotechnology and Training and Simulation Technology.

Our Fiscal Year 1984 Aerospace Biotechnology program continues technology development to improve the performance of the human component in our weapons systems and in combat situations by refining crew selection, enhancing man/machine integration, and improving safety and environmental protection from hazards such as radiation, chemicals, and mechanical noise.

To improve operational readiness through more effective training and increased weapon system supportability, our Training and Simulation Technology is concentrating on improvements to simulation and training devices, education and training techniques, human factors and new concepts in logistics and maintenance. Development and validation of personnel selection and classification tests, directed by the Congress, will receive greater emphasis in Fiscal Year 1984. Another major research area continuing in Fiscal Year 1984 is the Advanced Simulator for Pilot Training, which is helping to develop innovative techniques for air-to-air and air-to-ground combat tactics.

MATERIALS

Our materials programs are driven by the need for lighter, stronger, cheaper, more durable materials, by the increasing uncertainty of supply for many strategic materials, and by a shrinking industrial production base.

While our exploratory development Materials program develops new and improved materials which are required to meet the increased performance, reliability and survivability demands of current and future aerospace systems, our Aerospace Structures and Materials Advanced Development program demonstrates the application of these new materials, as well as advanced structural design concepts, new fabrication technology, and high energy laser hardening techniques. Direct benefits are reduced system cost, weight and technical risk, along with increased systems performance and survivability.

In Fiscal Year 1984, our efforts in rapid solidification technology and powder metallurgy seek to produce alloys with higher strength, lower weight, increased toughness, improved corrosion resistance, and ease of manufacturing. The success of weight-reducing composite materials in aircraft as diverse as the B-1, F-16, F/A-18, and AV-8B provides the incentive to develop these materials for primary aircraft structures. We are also pursuing radar absorbing coatings and structures which can help our aircraft elude and penetrate enemy defenses. In addition, we are pursuing improved/new electromagnetic and electronic materials for IIR detectors and arrays, microwave devices and electrooptics.

ENVIRONMENT

The environment in which we operate can impose limits on what we do in carrying out the Air Force mission. We must find ways to operate within environmental limits, both natural ones and those imposed by the enemy. Our environmental programs are Geophysics exploratory development, Civil and Environmental Engineering Technology, and Space Systems Environmental Interactions Technology.

The technology developed in the Geophysics program will enable Air Force system planners, designers and operational commanders to mitigate the effects of the geophysical environment, and, in selected cases, to exploit them. Recognizing weather affects precision guided munitions, in Fiscal Year 1984 we are continuing to develop methods to gather meteorological data needed to implement tactical decision aids for planners and aircrews. Decision aids for visible and laser systems will be completed; development of decision aids for millimeter wave weapons systems will be continued.

Our Civil and Environmental Engineering Technology program provides the technology base to enhance force readiness and improve sortie generation capability. One of our Fiscal Year 1984 programs will continue to emphasize technology developments for Rapid Runway Repair in the areas of bomb damage repair, alternate launch and recovery surfaces and aircraft response to runway surface roughness.

Within the Space Systems Environmental Interactions Technology program, we will develop space measuring and diagnostic techniques to assess the effects of the space environment on large, high power systems. The design tools and engineering standards produced will be validated on a future space shuttle flight.

SPACE TECHNOLOGY

Space Technology is not one of the functional areas into which we usually divide the Air Force Technology Base. Indeed, all the technologies we use in space applications can be described in terms of one of the areas already described--Materials, Electronics, and so on--and I have mentioned a number of space related efforts in previous sections. However, I would like to discuss separately some of our programs for space applications for two reasons. First, space is an increasingly important national security area, and we are becoming more dependent than ever on space systems for the effective conduct of military missions. Secondly, space technology illustrates a key role of Technology Base in our defense posture.

It is not fully clear how the military role in space will develop over the next decade, but we cannot wait for final answers. Our technology programs must make available a range of technical options to support whatever roles and systems our national decision makers choose. The critical importance of space systems is reflected in the Air Force decision to activate the Air Force Space Technology Center at Kirtland AFB, New Mexico. This new center will guide our space technology efforts to ensure we obtain the maximum return on investments in space.

A pressing need for future space systems is more efficient power generation and storage capability. Our Aerospace Propulsion program is developing specific technologies which will double solar cell efficiency and significantly increase on-board power storage. In our Defense Research Sciences program, we will continue a major new initiative in support of space power. These efforts, involving study of fundamental material properties and processes, are aimed at threefold improvements in continuous power generation and tenfold improvements in pulsed power.

Our Fiscal Year 1984 program will exploit the already excellent progress on traveling wave tube design for space communications. Several design approaches including an uplink power tube for MILSTAR terminals will be developed in our Command, Control, and Communications program to address a serious need for improved reliability and cost.

To reduce the dependence of our space systems on ground control, a major vulnerability, we are developing technologies in our Space Vehicle Subsystems program that will promote a higher degree of autonomy on orbit. We are developing an autonomous attitude and navigation system with an order-of-magnitude improvement in attitude control capability. We are developing small, solid state devices such as bubble memories to replace bulky mechanical devices for reliable data and program storage.

We are continuing to work on the technologies needed for the next generation of space missions. New thrusts will address those technologies which support the development of space-based defense, surveillance systems, and manned aerospace systems. Included are technologies which increase survivability, permit weight reduction, improve both spatial and thermal control, permit greater orbital changes and improve defensive hardness against both nuclear and laser threats. In partnership with the Defense Advanced Research Projects Agency, we are developing technologies needed for space-based surveillance (infrared and radar) and a space-based laser.

To use space effectively, we must characterize and understand its very hostile environment. The Space Systems Environmental Interactions Technology program, conducted to assess the effects of the space environment on large high power space systems, will build a prototype system to control electrical charging of spacecraft by the near earth space environment. Another thrust will quantify space effects on electronic microcircuits with near-term focus on preparation of instrumentation for a future radiation measuring satellite. A major outcome of this program will be guidelines for the space operation of VHSIC devices.

IX. AIR FORCE MANAGEMENT

The Air Force has initiated a major force modernization program with both public and Congressional support. Our challenge is to manage this modernization in the most efficient manner and at the lowest possible cost.

Historically, cost growth in our weapon system programs has been one of our most serious problems in the acquisition process. Technical, schedule and funding profile changes, as well as inflation, are prime causes of cost growth. In almost all cases, cost growth can be controlled with better management.

Some of the positive management actions we have taken to control weapon system costs are improving program stability, instituting multiyear contracting where appropriate, working with industry to enhance cost/price control procedures, improving weapon system quality and durability, and increasing competition and dual/second sourcing.

Other continuing initiatives include improvements to our industrial base capability and our NATO initiatives to increase combat effectiveness and strengthen the overall military and industrial capability of the alliance.

PROGRAM STABILITY

Increasing program stability is an important step toward controlling cost growth. In developing and acquiring systems, we need to recognize that some engineering program changes caused by threat reassessment and new technology are needed to maximize the effectiveness of the system when deployed. We are now integrating new technology into our weapon systems by using Pre-Planned Product Improvement (P^3I). P^3I is an evolutionary approach to systems development that plans future improvements while meeting near-term requirements with lower risk alternatives. For example, in the F-16 Multinational Staged Improvement Program (MSIP), P^3I will enable the Air Force to integrate future improvements with minimum disruption and risk.

Production rate changes caused by optimistic cost and quantity estimates and budget constraints are a major reason for program instability. Decreases in production rates cause unit price increases because of the extra overhead burden on smaller quantities.

The Air Force is taking firm steps to monitor and control such undesirable changes. The approach we are emphasizing is improved baseline management. Baseline management will provide Air Force managers with a tool to control and minimize program changes in terms of cost, schedule and performance. Baseline management is being used to reconcile program content with program funding, and to establish more disciplined change control procedures. Once we establish a program baseline, we will work within the DOD and with the Congress to minimize changes. Deviations from the baseline will be evaluated on the basis of operational requirements, technical, schedule, and cost trade-offs. For necessary changes to the agreed to baseline, our program reviews will always include an alternative that does not require additional funding--a zero-cost alternative.

We are also taking steps to improve and validate cost estimates. Too often in the past, incomplete or overly optimistic estimates were used in developing program funding requirements. Now, all cost proposals will be validated by an Air Force field agency before being used by Headquarters Air Force and all cost estimates will be developed by product divisions. To further improve the quality of our budget requests, we are placing increased emphasis on the use of independent cost analyses and sufficiency reviews to formulate more accurate estimates during the budget development process.

MULTIYEAR PROCUREMENT CONTRACTS

Multiyear contracting reduces the cost of low risk, stable production programs by providing funding for larger, more economical lot buys rather than smaller buys on an annual basis. The Fiscal Year 1982 Authorization Act included significant multiyear legislation which has permitted the expanded use of multiyear contracting for weapon system programs.

As a result, we are currently using the multiyear procurement strategy for the F-16 airframe, TRC-170 Troposcatter Radio, DSP, Navstar GPS and the KC-10 aircraft, at an estimated savings of $1.2 billion. For Fiscal Year 1984 we are proposing it for the B-1B, F-15, KC-135 Reengining program, and the Communications Nodal Control Element. We will continue to work with the Congress to identify and propose additional multiyear candidates when it has been determined that they meet the criteria of: significant benefit to the Air Force; stable requirements, configuration, and funding; confidence in cost estimates and contractor capabilities; as well as inherent and substantial program savings associated with multiyear procurement.

COST/PRICE CONTROL

We have also begun a major effort to stem the growth trend in the prices of our weapon systems. We are committed to a complete review of total program costs with initial emphasis on compensation, including executive compensation. To do this, we have chartered an ad hoc task force to review the pricing of Air Force acquisitions. The task force will:

a. Review current contracting and pricing policies.

b. Examine the total compensation package.

c. Review overhead costs.

d. Evaluate the effect of economic price adjustment policies.

Similar functions for all DOD components will be performed by the DOD ad hoc task force, chaired by the Air Force.

In another major effort to stem the growth in the prices of our weapons systems, we are emphasizing "Should Cost" analyses. Should Cost is a technique of contract pricing that employs an integrated team of government acquisition, contract administration, audit, and engineering representatives to conduct a coordinated, in-depth cost analysis at the contractor's and subcontractor's plants.

The objective is to identify uneconomical or inefficient practices in the contractor's management and operations and to quantify the findings in terms of their impact on cost. The result is the development of a realistic price objective that reflects reasonably achievable economies and efficiencies.

We are currently using Should Cost analyses on such programs as the 30mm Gun Pod, IR Maverick and the ALCM. In reenergizing this concept, we are reviewing other major programs in the Air Force for potential use.

Additionally, we have instructed our contracting staffs to watch for practices that might have contributed to labor cost increases, such as failure to use local wage surveys as a basis for wage rate increases; total dependence on the "industry average rate" and historical pricing data; and, excessive use of economic price adjustment provisions. The major Air Force commands have been told to challenge the wage settlements of service contractors and wage determinations issued by the Department of Labor when they are not reasonable.

To get defense contractors' support, we have discussed our price control efforts with chief executive officers of major aerospace companies, and have directed field contracting units to ensure contractors are fully aware of our "war on inflationary contract costs."

IMPROVED WEAPON SYSTEM QUALITY AND DURABILITY

We are promoting "front-end" quality in our weapon systems which means planning and organizing for quality from the start. Efficient management requires that quality be designed in and built in rather than inspected in. This requires a system of error prevention throughout the systems acquisition process. Such a system generally results in sharply lower rates of scrap and rework and higher productivity. Quality, therefore, is an investment with high potential for returns, but its chances of success are governed by the attitudes of management, just as with any other investment. We are participating with the other Services and the Defense Logistics Agency in efforts to foster quality conscious attitudes to make sure that top management in both the DOD and in industry understand their leadership responsibility for quality.

Specifically, we are addressing improved readiness, reliability, maintainability and supportability of our weapon systems by emphasizing improved design and testing in the early phases of system development.

In Fiscal Year 1984, we will initiate a logistics oriented R&D program, consisting of three elements. The first element, the Logistics Research and Development Technology program, is designed to identify areas which have a high potential for logistics and readiness payoffs. It will develop new computer-based technologies to enable more reliable and maintainable weapons systems to be designed, and new technologies to improve maintenance and support. It will also develop technologies to enhance the dormant reliability of weapons systems in storage.

The second element, Logistics Technology of Weapons Systems, is designed to validate and accelerate the transition of new, high potential laboratory technologies for improved logistics into prototype, or full scale development programs. Projects such as the Multifunctional Integrated Power Unit and the On-board Inert Gas Generator System are being transitioned into several programs. The third element supports reliability and maintainability (R&M) improvements in ongoing programs by promoting increased awareness of the logistics benefits that can be achieved through the application of new technology.

We are also revising System Acquisition Research and Development policies to incorporate readiness factors in the initial stages of development. We have initiated a new effort for acquisition logistics with emphasis on early identification of sound logistics efforts, and are working very closely with the Office of Secretary of Defense (OSD) on an OSD-level Logistics R&D Policy Group. This group will develop recommendations for the scope, direction, content and funding levels of the DOD-wide Logistics R&D program mentioned above.

INCREASED COMPETITION - DUAL/SECOND SOURCES

Unquestionably one of the best ways to control costs in weapons systems acquisition is through effective competition. We are maximizing competition. Several actions have been taken to encourage a positive attitude toward competition throughout our work force, and to ensure that competitive acquisition strategies are considered.

We are designating individuals to act as advocates for competition in the planning stages of the acquisition process, and have assigned challenging competition goals to each major Air Force command. Additionally, the use of second sourcing techniques such as "leader-follower" directed licensing and parallel development have been encouraged where appropriate.

Prime examples have been: the AMRAAM program, where a second contractor was introduced as a "follower" during full scale development to allow for early competitive procurement; the F-16 canopy program was dual sourced to minimize cost by increasing competition and to provide a safety valve in case of problems with one of the contractors; and the IIR Maverick program, where we will qualify a second source to stimulate competition and allow for increased annual production quantities.

With respect to future uses of second sourcing, two contractors are currently in a parallel development phase on the NAVSTAR GPS User Equipment program. A final production decision is scheduled in Fiscal year 1984.

INDUSTRIAL RESOURCE MANAGEMENT

INDUSTRIAL PREPAREDNESS

Our priority program to improve the readiness and sustainability of our combat forces includes increasing Industrial Preparedness--the ability to use our industrial capacity for peacetime industrial surge or partial/full wartime industrial mobilization.

One of the major new efforts under the Industrial Preparedness program which will guide our industrial base investments is Industrial Base Planning. At the same time we are pursuing a long-term, multifaceted program for improving our industrial base capability and surge capacity with our Manufacturing Technology (MANTECH) program, our Technology Modernization/Industrial Modernization Incentives

Program, and our Industrial Facilities Program. Details of these efforts are discussed below.

Industrial Base Planning: Our Industrial Base Planning project performs analyses of the industrial base and develops plans to correct deficiencies, reduce acquisition costs, shorten lead times and improve our overall industrial capability. Its goal is to make industrial base investments which: (1) improve productivity, (2) increase industrial responsiveness, and (3) ensure that the industrial base is adequate to respond to industrial surge and mobilization requirements. For example, we are conducting several analyses including military jet engine and fighter aircraft industrial responsiveness to identify problems and weaknesses and propose actions for improvements to the industrial base for these products.

Manufacturing Technology: Within the Air Force, we have already felt the impact of a defense industrial base which has deteriorated significantly over the past two decades. Manufacturing inefficiencies cause high costs which limit the quantity of weapon systems we can buy, as well as the timeliness of delivery. In addition, the capability of the industrial base to surge in response to an emergency still remains suspect.

One way to improve the industrial base is to engineer modern manufacturing methods. Our MANTECH program increases industrial capacity and productivity by engineering new manufacturing equipment and techniques. These new manufacturing methods also reduce product and depot maintenance costs, shorten delivery times, and enhance product performance through improved quality and better production quality control.

Additional benefits include improved production yields and establishment of a domestic source for products otherwise only available abroad. An analysis of 76 projects completed over a recent four year term shows an estimated $500 million per year production cost reduction for Air Force products when the new manufacturing methods are fully implemented in industry. Yet during the four years in which these projects were completed, the total cost of our MANTECH program averaged less than $45 million per year.

Some examples of recent MANTECH activities include the engineering of a method to produce high restivity detector silicon which provided a domestic source for this material and cut its price in half; establishment of an electronic microchip packaging system, reducing its cost by 75 percent, and allowing the packaging of five times as much electronics in a given volume than otherwise possible; and the development of a tool for nondestructive inspection of aircraft fastener holes that reduces the cost and time for these periodically required inspections by a factor of 100.

Technology Modernization/Industrial Modernization Incentives: We have found that many commercial industries supporting our requirements find it uneconomical to invest in manufacturing modernization, often because of small, year-to-year production quantities. The result is that much of the industrial equipment and facilities used to manufacture our systems, equipment and material are old and inefficient. As a matter of fact, over 60 percent of this equipment is well over 20 years old. The old industrial plant and inefficient manufacturing methods cause high prices, long lead times, lower product quality, and a very limited ability to surge and sustain wartime production requirements. These problems inhibit productivity growth.

Our Technology Modernization (TECH MOD) program is a joint venture between the Air Force and our contractors to promote generic industrial modernization. The TECH MOD program benefits both industry and government through direct Air Force investment. The Air Force provides up-front seed money and assumes some of the technical risk. The contractor makes the major modernization through capital reinvestment. Additional indirect incentives can be provided to the contractor by linking his TECH MOD contract to acquisition contract modifications. Among the incentives used are shared productivity savings rewards, contractor investment protection, performance incentive fees, award fees and multiyear contracts.

A TECH MOD is based on a "top-down" factory analysis to determine the optimum manufacturing approach for any operation. Negotiations follow, which define specific tasks to be accomplished. Integrated Computer Aided Manufacturing (ICAM) (a MANTECH accomplishment) products are used in the factory analysis to optimize shop layout, providing highly efficient material flow and scheduling.

We are continuing our TECH MOD program under the new DOD Industrial Modernization Incentives Program (IMIP). IMIP will incentivize contractor financing for capital investments through productivity shared savings rewards and contractor investment (termination) protection. Investments will include all assets and real property. Special emphasis is being placed on improving productivity of subcontractors, as well as vendors.

For example, an Industrial Technology Modernization Program has been initiated to stimulate F-16 vendors through financial incentives and effective program management to implement new technology, capital equipment and improve manufacturing processes. All F-16 subsystems, equipment and hardware vendors are being considered. The main thrust is initially directed to 28 vendors who are subsystem related. These vendors produce many of the high dollar items that make up 50 percent of the total purchase price of the aircraft. In addition, these vendors are also suppliers to other Air Force and DOD programs. The programs, as currently organized, will require a government investment of up to $52 million, with a vendor investment estimated at $358 million. This combined effort will yield savings of approximately $151 million to the F-16 program and $451 million in savings on all DOD programs impacted.

The IMIP test provides the Air Force and industry an opportunity to engage in a joint venture to improve the defense industrial base in a win/win environment. We feel that the IMIP test has the potential for stimulating and enhancing our national productivity, and modernizing the industrial base.

Industrial Facilities: Our Industrial Facilities program funds the maintenance, rehabilitation, and modernization of Air Force-owned, contractor-operated facilities and equipment at 19 Air Force-owned and in excess of 200 contractor -owned plants. This continuing program provides a centralized policy on the use, expansion, replacement, maintenance, and/or disposal of industrial facilities.

Our Air Force plants, some of which were built during World War II, provide an industrial base in areas where contractors are unwilling to capitalize--partially because of the cyclical nature of the way we do business and also because of the lack of a commercial base to support the use of these plants if they are not required for defense work. These facilities are also maintained to support a production mobilization base in the time of conflict.

In accordance with Air Force policy, the Industrial Facilities program encourages the expeditious but selective divestment of Air Force-owned facilities while ensuring that such disposal actions do not disrupt or otherwise hinder support of other Services' production requirements or interfere with essential defense production and industrial responsiveness requirements. This is accomplished not only through negotiated sales, but where applicable, through phase out of old equipment by encouraging contractor investment in more efficient, state-of-the-art equipment.

During the past 18 months the following government-owned/contractor-operated facilities have been sold through negotiated sales:

Air Force Plant #	Contractor	Location	Negotiated Sales Price*
AFP #50	Kaiser	Halethrope, MD	$ 6,500,000
AFP #47	Alcoa	Cleveland, OH	$13,300,000
AFP #64	Wyman-Gordon	N. Grafton, MA	$34,450,000

*The savings accruing to the Air Force as a result of these sales cannot be determined.

NATO INITIATIVES

The Air Force encourages effective armament cooperation with our NATO allies through such initiatives as the family of weapons concept, NATO's Periodic Armaments Planning System, dual production, and development of reciprocal purchasing Memoranda of Understanding (MOUs). Our objectives are to increase combat effectiveness through standardization and interoperability, strengthen the overall military and industrial capability of the Alliance, reduce unnecessary duplication of programs, and conserve our vital defense resources.

Through the family of weapons concept, Alliance requirements are harmonized for discrete mission areas. When complementary systems are found to be compatible, shared development programs may be undertaken. The MOU for Advanced Air-to-Air Missile Systems was signed by the United States, United Kingdom, Germany, and France in August 1980, and is the first use of this concept. France presently has special observer status in this program, while the others are full participants. The United States will develop and produce the AMRAAM, and Germany and the United Kingdom will jointly develop and produce the Advanced Short Range Air-to-Air Missile (ASRAAM). The MOU allows the participants to procure, co-assemble, and/or produce the others' missile. This joint project will save the United States the cost of developing the next generation short range missile.

Since the NATO Conference of National Armament Directors instituted the Periodic Armaments Planning System in 1980, significant progress among NATO governments has been made in harmonizing operational requirements, exchanging technical information and exploring opportunities for cooperation in the areas of tactical fighter aircraft, air delivered weapons, electronic warfare, tactical reconnaissance/intelligence, avionics and landing systems. For example, three air-to-ground missiles are being considered for cooperative feasibility study and development. These include a long range stand-off missile (LRSOM), a short range anti-radiation missile (SRARM) and a low cost powered dispenser (LOCPOD). Discussions preliminary to MOU negotiations are underway among Germany, the United Kingdom and the United States on the LRSOM and among Canada, Italy, The Netherlands, the United Kingdom and the United States on the SRARM. Similar discussions are expected to begin on the LOCPOD in early 1983.

The establishment of dual production capabilities for the same weapon system, such as the F-16, on both sides of the Atlantic, may be accomplished through license arrangements. This provides for standardization and savings of funds that would have otherwise been spent to develop similar systems. Italy has been appointed the leader of a NATO consortium to coproduce the Imaging IR MAVERICK missile in Europe. Presently, the consortium consists of Belgium, Germany, The Netherlands, Italy and Turkey. Discussions between the United States and Italy, preliminary to MOU negotiations, are currently under way.

The fourth initiative involves the reciprocal purchasing MOU for defense equipment which allows foreign contractors to bid on U.S. contracts and U.S. contractors to bid on foreign contracts. In support of this initiative, the Air Force has fostered an understanding of our acquisition process through sponsored visits by foreign industries to our Systems and Logistics Commands. These agreements and the resultant policies are incorporated into the Defense Acquisition Regulation as directives to all acquisition activities.

In addition, we have a European Workload Program with the objective of increasing our readiness in Europe by placing some maintenance and overhaul capability there. Other examples of cooperation include the NATO E-3A AWACS, the Navstar GPS, the EIFEL program, the purchase from the United Kingdom of the Rapier missile for point air defense of our air bases there, the reengining of the KC-135 with the U.S.-French developed CFM56 engine, and the development of LANTIRN's heads-up display by a contractor in the United Kingdom.

In keeping with present administration policy, the Air Force is actively encouraging the expansion of contacts between U.S. and other NATO country industries to determine and define areas of collaboration. This expansion of contacts will allow participating governments to harmonize their respective requirements and enable efficient teaming of industry to propose the most cost-effective solutions to defense requirements.

X. CONCLUSION

Mr. Chairman, this concludes my statement. Our nation faces a serious threat today--a threat that has been heightened in part because of our unilateral self-restraint and the hope that the Soviets would do likewise. Unfortunately, this approach has not worked. While we held back, the Soviets have modernized and expanded their military capability at such a determined pace that they now threaten to achieve clear, overall military superiority.

To counterbalance the massive Soviet military buildup, we have taken great care in structuring the Air Force's RDT&E and weapon system procurement to fully support, in conjunction with the other elements of the defense program, our national security objectives.

For Fiscal Year 1984, we remain consistent in our budget priorities--our people, modernizing our strategic forces, readiness and sustainability, expanding our airlift capability and our tactical force modernization. Since the RDT&E and Procurement programs represent future capability, it is imperative that they be carried out fully and completely --not just during Fiscal Year 1984, but for years to come. In this respect, our program not only addresses the threat, it also has been prudently scoped to be economically feasible and politically supportable over the long run.

To conserve our precious resources, we are taking into consideration the contributions of our allies; we are joining with our sister services and other government agencies in those development efforts which make sense; and we are emphasizing efficiency, better management, and innovative, cost-effective approaches in the selection and development of weapon systems.

I strongly urge your support for the RDT&E and Procurement programs I have described.

TABLE I
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1984 AIRCRAFT PROCUREMENT ESTIMATES
(In Millions of Dollars)

	QTY	FY 84 ESTIMATES
COMBAT AIRCRAFT		
B-1B Strategic Bomber	10	$ 5,626.8
F-16 Tactical Fighter	120	1,962.9
F-15 Tactical Fighter	48	1,960.4
KC-10A Advanced Tanker/Cargo Aircraft	8	759.0
E-3A Airborne Warning and Control System	-	76.2
MC-130H	2	66.8
Tactical Fighter Derivative Aircraft	-	21.4
	188	$10,473.5
AIRLIFT AIRCRAFT		-
C-5B Airlift Aircraft	4	1,316.6
European Distribution Aircraft	16	32.9
	20	1,349.5
TRAINER AIRCRAFT		
T-46A Next Generation Trainer	-	5.8
		5.8
OTHER AIRCRAFT		
TR-1	5	214.8
HH-60D Helicopter	-	25.9
	5	240.7
MODIFICATION OF IN-SERVICE AIRCRAFT		3,208.8
AIRCRAFT SPARES & REPAIR PARTS		5,128.8
AIRCRAFT SUPPORT EQUIPMENT & FACILITIES		
Other Production Charges (NATO AWACS - $112.1)		1,528.7
Common Ground Equipment		419.4
War Consumables		182.5
Industrial Responsiveness		169.5
		2,300.1
TOTAL AIR FORCE AIRCRAFT PROCUREMENT	213	$22,707.2

TABLE II
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1984 MISSILE PROCUREMENT ESTIMATES
(In Millions of Dollars)

	QTY	FY 84 ESTIMATES
BALLISTIC MISSILES		
M-X	27	$ 2,770.0
ICBM C^3 Integration	-	30.9
	27	2,800.9
OTHER MISSILES		
GLCM	120	604.6
AGM-65D Maverick	2,600	346.7
AGM-7M Sparrow	1,005	183.7
AGM-88A HARM	285	178.0
AIM-9M Sidewinder	1,700	104.9
ALCM	-	90.4
Rapier	-	62.9
AMRAAM	-	62.6
Tactical Drones	400	48.8
Target Drones	-	30.0
Stinger	108	4.9
	6,218	1,717.4
MODIFICATION OF IN-SERVICE MISSILES		135.7
SPARES & REPAIR PARTS		356.8
OTHER SUPPORT		
Special Programs		2,345.6
Space Programs		1,180.9
Industrial Facilities		33.5
		3,560.0
TOTAL AIR FORCE MISSILE PROCUREMENT		$ 8,570.8

TABLE III
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1984 RDT&E BUDGET ESTIMATES
(IN MILLIONS OF THEN YEAR DOLLARS)

RDT&E PROGRAM BY MAJOR MISSION AREAS

TITLE	FY 84
STRATEGIC	$ 5,137.8
GENERAL PURPOSE	1,531.8
SPACE	769.0
COMMAND, CONTROL, AND COMMUNICATIONS	963.1
MGMT, SUPPORT, & DEFENSE-WIDE SYSTEMS	1,504.8
TECHNOLOGY BASE	1,290.9
INTELLIGENCE & CLASSIFIED PROGRAMS	2,454.9
TOTAL	$13,652.3

Note: Total may not add due to rounding.

TABLE IV
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1984 RDT&E BUDGET ESTIMATES
(IN MILLIONS OF THEN YEAR DOLLARS)

STRATEGIC

PE #	TITLE	FY 84
	STRATEGIC OFFENSE	
	77% ICBM LEG ($3,480.9M)	
64312F	PEACEKEEPER	$3,378.4
63311F	ADVANCED STRATEGIC MISSILE SYSTEMS	97.5
11213F	MINUTEMAN	5.0
	23% BOMBER LEG ($1,020.9M)	
64226F	B-1B	749.9
11113F	B-52 SQUADRONS	86.9
64738F	PROTECTIVE SYSTEMS	50.0
63258F	COMMON STRATEGIC ROTARY LAUNCHER	41.5
64326F	STRATEGIC CONVENTIONAL STANDOFF CAP	35.0
64361F	AIR LAUNCHED CRUISE MISSILE	28.5
63319F	ADVANCED TECHNOLOGY CRUISE MISSILE	17.9
11142F	KC-135 SQUADRONS	11.3
	SUBTOTAL STRATEGIC OFFENSE	$4,501.8M
	STRATEGIC DEFENSE	
	23% AIR SURVEILLANCE ($148.6M)	
12417F	CONUS OTH-B RADAR	$ 99.1
12412F	DEW RADAR STATIONS	31.3
63716F	ATMOSPHERIC SURVEILLANCE TECHNOLOGY	11.7
12411F	SURVEILLANCE RADAR STATIONS/SITES	5.8
12325F	JOINT SURVEILLANCE SYSTEM	.8
	14% MISSILE SURVEILLANCE ($ 85.2M)	
63425F	ADVANCED WARNING SYSTEM	30.9
12433F	INTEGRATED OPERATIONAL NUDETS DETECT SYS	30.5
12423F	BALLISTIC MISSILE EARLY WARNING SYSTEM	10.8
63424F	MISSILE SURVEILLANCE TECHNOLOGY	7.4
12432F	SLBM RADAR WARNING SYSTEM	3.8
12313F	BALLISTIC MSL TAC WARNING/ATTACK ASSESSMENT	1.9

STRATEGIC DEFENSE (Continued)

PE #	TITLE	FY 84
	49% SPACE SURVEILLANCE ($311.7M)	
64406F	SPACE DEFENSE SYSTEMS	205.6
12311F	NORAD COMBAT OPERATIONS CENTER	49.5
63438F	SATELLITE SYSTEMS SURVIVABILITY	34.0
63428F	SPACE SURVEILLANCE TECHNOLOGY	22.6
	14% OTHER SURVEILLANCE ($ 90.4M)	
12431F	DEFENSE SUPPORT PROGRAM	48.7
63603F	SPACE LASER PROGRAM	36.1
12424F	SPACETRACK	5.7
	SUBTOTAL STRATEGIC DEFENSE	$ 635.9M
	TOTAL STRATEGIC	$ 5,137.8M

TABLE V
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1984 RDT&E BUDGET ESTIMATES
(IN MILLIONS OF THEN YEAR DOLLARS)

GENERAL PURPOSE

PE #	TITLE	FY 84
	43% AIR-TO-SURFACE ATTACK ($661.2M)	
27133F	F-16 SQUADRONS	107.4
27132F	FIGHTER DERIVATIVE	104.7
64616F	PAVE MOVER ENGAGEMENT SYSTEM	90.5
64249F	NIGHT PRECISION ATTACK (LANTIRN)	89.9
27129F	F-111 SQUADRONS	84.4
64607F	WIDE AREA ANTI-ARMOR MUNITION	52.2
63230F	ADVANCED TACTICAL FIGHTER TECHNOLOGY	37.4
64614F	MEDIUM RANGE AIR-TO-SURFACE MISSILE	21.9
64201F	AIRCRAFT AVIONICS EQUIPMENT DEVELOPMENT	21.8
64602F	ARMAMENT/ORDNANCE DEVELOPMENT	20.9
64325F	STANDOFF ATTACK WEAPON	16.4
63747F	PAVE MOVER	4.0
63249F	NIGHT ATTACK PROGRAM	3.7
27131F	A-10 SQUADRONS	2.7
64733F	SURFACE DEFENSE SUPPRESSION	1.9
64608F	CLOSE AIR SUPPORT WEAPON SYSTEM	1.5
	23% COUNTERAIR ($347.4M)	
64314F	ADV MEDIUM RANGE AIR-TO-AIR MISSILE (AIM-120A)	188.6
27130F	F-15 SQUADRONS	117.8
64725F	COMBAT IDENTIFICATION SYSTEMS	27.0
63742F	COMBAT IDENTIFICATION TECHNOLOGY	14.0
	18% ELECTRONIC COMBAT ($281.1M)	
64742F	PRECISION LOCATION STRIKE SYSTEM	69.7
27136F	F-4G WILD WEASEL SQUADRONS	53.3
64737F	AIRBORNE SELF PROTECTION JAMMER	42.2
64739F	TACTICAL PROTECTIVE SYSTEMS	34.9
64220F	EW COUNTER RESPONSE (EF-111A)	34.5
64724F	TAC C^3 COUNTER MEASURES	28.5
64606F	JOINT TACTICAL MISSILE SYSTEM (JTACMS)	9.9
27162F	TACTICAL AGM MISSILES (HARM)	6.1
63749F	C^3 CM ADVANCED SYSTEMS	1.9

GENERAL PURPOSE (CONTINUED)

PE #	TITLE	FY 84
	4% TACTICAL RECONNAISSANCE ($54.3M)	
64756F	SIDE LOOKING AIRBORNE RADAR	23.9
64750F	INTELLIGENCE EQUIPMENT	15.4
64710F	RECONNAISSANCE EQUIPMENT	13.4
27431F	TACTICAL AIR INTELLIGENCE SYSTEM ACTIVITIES	1.5
27247F	TACTICAL SURVEILLANCE SYSTEM	.3
	8% MOBILITY ($123.4M)	
64753F	COMBAT HELICOPTER MODERNIZATION	66.6
64231F	C-17 PROGRAM	26.8
63256F	ADVANCED VERTICAL LIFT AIRCRAFT (JVX)	14.4
41119F	C-5 AIRLIFT SQUADRONS	4.8
64703F	AEROMEDICAL SYSTEMS DEVELOPMENT	3.9
41840F	MAC COMMAND/CONTROL SQUADRONS	3.3
41118F	C-141 AIRLIFT SQUADRONS	3.2
41115F	C-130 AIRLIFT SQUADRONS	.5
	4% OTHER GENERAL PURPOSE ($64.3M)	
64362F	GROUND LAUNCHED CRUISE MISSILE	36.5
64601F	CHEMICAL/BIOLOGICAL DEFENSE EQUIPMENT	15.6
64617F	AIR BASE SURVIVABILITY	6.2
63307F	AIR BASE SURVIVABILITY AND RECOVERY	3.8
35155F	THEATER NUCLEAR WEAPON STORAGE AND SECURITY SYS	2.2
	TOTAL GENERAL PURPOSE	$1,531.8M

TABLE VI
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1984 RDT&E BUDGET ESTIMATES
(IN MILLIONS OF THEN YEAR DOLLARS)

SPACE

PE #	TITLE	FY 84
	52% SPACE LAUNCH ($396.6M)	
64411F	SPACE SHUTTLE	337.4
35171F	SPACE LAUNCH SUPPORT	34.5
35119F	SPACE BOOSTERS	15.6
63401F	SPACE VEHICLE SUBSYSTEMS	6.3
63406F	ADVANCED MILITARY SPACEFLIGHT CAPABILITY	2.8
	19% ORBITAL SUPPORT ($145.1M)	
35130F	CONSOLIDATED SPACE OPERATIONS CENTER	72.7
35110F	SATELLITE CONTROL FACILITY	72.4
	29% OTHER SPACE PROGRAMS ($227.3M)	
64778F	NAVSTAR GPS	95.7
63402F	SPACE TEST PROGRAMS	71.1
35165F	NAVSTAR GPS (SPACE/GND SEGMENTS)	27.1
35160F	DEFENSE METEOROLOGICAL SATELLITE PROGRAM	26.6
35164F	NAVSTAR GPS (USER EQUIPMENT)	6.8
	TOTAL SPACE	$ 769.0M

TABLE VII
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1984 RDT&E BUDGET ESTIMATES
(IN MILLIONS OF THEN YEAR DOLLARS)

COMMAND, CONTROL, AND COMMUNICATIONS

PE #	TITLE	FY 84
	62% STRATEGIC ($597.7M)	
33601F	AIR FORCE SATELLITE COMMUNICATIONS	188.6
33603F	MILITARY STRATEGIC AND RELAY SYSTEM	149.9
33131F	MINIMUM ESSENTIAL EMERGENCY COMMUNICATIONS	132.3
33152F	WWMCCS INFORMATION SYSTEM	25.3
32015F	NATIONAL EMERGENCY AIRBORNE COMMAND POST	20.9
12436F	COMMAND CONTROL PROCESS/DISPLAY SYSTEM	20.0
12310F	WWMCCS ADP - NORAD/ADCOM	16.1
11316F	SAC COMMUNICATIONS	15.3
63735F	WWMCCS ARCHITECTURE	14.9
35158F	SATELLITE DATA SYSTEM	7.6
11312F	POST ATTACK COMMAND AND CONTROL SYSTEM (E-4)	6.9
	26% TACTICAL ($249.0M)	
27417F	TAC AIRBORNE COMMAND AND CONTROL SYSTEM (E-3A)	69.1
27423F	ADVANCED COMMUNICATIONS SYSTEM	65.2
64754F	JOINT TACTICAL INFO DISTRIBUTION SYSTEM	49.3
28010F	JOINT TACTICAL COMMUNICATIONS PROGRAM	25.8
63789F	C^3 ADVANCED DEVELOPMENT	16.7
27412F	TACTICAL AIR CONTROL SYSTEM	8.6
64779F	JOINT INTEROPERABILITY TAC COMMAND/CONTROL	5.6
64321F	JOINT TACTICAL FUSION PROGRAM	4.9
27411F	OVERSEAS AIR WEAPON CONTROL SYSTEM	3.3
27595F	BASE COMMUNICATIONS - TACTICAL AIR FORCES	.5
	12% DEFENSE-WIDE ($116.4M)	
33110F	DEFENSE SATELLITE COMMUNICATIONS SYSTEM (DSCS)	41.0
63431F	ADVANCED SPACE COMMUNICATIONS	39.9
64740F	APPLICATION FOR INFORMATION PROCESSING TECH	7.9
33144F	ELECTROMAGNETIC COMPATIBILITY ANALYSIS CENTER	7.1
33126F	LONG HAUL COMMUNICATIONS (DCS)	6.3
35114F	TRAFFIC CONTROL/APPROACH/LANDING SYSTEM	6.3
63727F	ADVANCED COMMUNICATIONS TECHNOLOGY	5.0
63726F	FIBER OPTICS DEVELOPMENT	2.8
	TOTAL COMMAND, CONTROL, & COMMUNICATIONS $	963.1M

TABLE VIII
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1984 RDT&E BUDGET ESTIMATES
(IN MILLIONS OF THEN YEAR DOLLARS)

MANAGEMENT, SUPPORT, AND DEFENSE-WIDE SYSTEMS

PE #	TITLE	FY 84
	23% MANAGEMENT ($352.8M)	
65806F	ACQUISITION AND COMMAND SUPPORT	303.4
65898F	MANAGEMENT HEADQUARTERS (R&D)	37.6
65304F	ACQUISITION AND COMMAND SUPPORT - TELECOM	6.0
65890F	INSTALLATION AUDIOVISUAL SUPPORT (R&D)	5.8
	36% SUPPORT ($536.2M)	
65807F	TEST AND EVALUATION SPT	391.0
64755F	IMPROVED CAPABILITY FOR DT&E	68.3
65708F	AIRCRAFT NAVIGATION SYSTEM VERIFICATION	38.7
64735F	RANGE IMPROVEMENT	18.0
64211F	ADVANCED AERIAL TARGETS DEVELOPMENT	10.7
64747F	ELECTROMAGNETIC RADIATION TEST FACILITIES	7.2
78019F	UTAH TESTING AND TRAINING RANGE	2.2
	41% DEFENSE-WIDE ($615.8M)	
64268F	AIRCRAFT ENGINE COMPONENT IMPROVEMENT PROGRAM	142.0
64223F	ALTERNATE FIGHTER ENGINE	132.1
64313F	T-46A (NEXT GENERATION TRAINER)	123.5
64227F	FLIGHT SIMULATOR DEVELOPMENT	25.0
64715F	DOD PHYSICAL SECURITY EQUIPMENT - EXTERIOR (ED)	18.0
64247F	MODULAR AUTOMATIC TEST EQUIPMENT (MATE)	16.7
65101F	PROJECT AIR FORCE	16.6
64706F	LIFE SUPPORT-SYSTEM	15.4
78026F	PRAM PROGRAM	14.5
64218F	ENGINE MODEL DERIVATIVE PROGRAM	13.9
64711F	SYSTEMS SURVIVABILITY (NUCLEAR EFFECTS)	11.8
64708F	OTHER OPERATIONAL EQUIPMENT	10.7
64212F	AIRCRAFT EQUIPMENT DEVELOPMENT	10.6
64609F	LOGISTICS TECHNOLOGY FOR WEAPON-SYSTEMS	10.1
64707F	WEATHER SYSTEMS	8.1
63226F	DOD COMMON PROGRAMMING LANGUAGE ADA	7.8
65306F	RANCH HAND II EPIDEMIOLOGY STUDY	5.0
78011F	INDUSTRIAL PREPAREDNESS	4.8
65872F	PRODUCTIVITY IMPROVEMENT	4.1
63714F	DOD PHYSICAL SECURITY EQUIPMENT - EXTERIOR (AD)	3.7

63707F	WEATHER SYSTEMS	3.2
63244F	AIRCRAFT NON-NUCLEAR SURVIVABILITY	2.9
84733F	GENERAL INTELLIGENCE SKILL TRAINING	2.9
01004F	INTERNATIONAL ACTIVITIES	2.7
65808F	ADV SYS ENGINEERING/PLAN	2.4
64222F	NUCLEAR WEAPONS SUPPORT	2.0
35887F	ELECTROMAGNETIC COMBAT INTELLIGENCE SUPPORT	1.8
64233F	TANKER, TRANSPORT, BOMBER TRAINING SYSTEM	1.5
63248F	CONCEPT DEVELOPMENT	1.0
71112F	INVENTORY CONTROL POINT OPERATIONS	1.0
	TOTAL MANAGEMENT, SUPPORT AND DEFENSEWIDE	$1,504.8M

TABLE IX
DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 1984 RDT&E BUDGET ESTIMATES
(IN MILLIONS OF THEN YEAR DOLLARS)

TECHNOLOGY BASE

PE #	TITLE	FY 84
	36% ELECTRONICS ($466.2M)	
63452F	VERY HIGH SPEED INTEGRATED CIRCUITS	$125.1
62204F	AEROSPACE AVIONICS/VHSIC	70.1
62702F	COMMAND, CONTROL & COMMUNICATIONS	69.3
61102F	DEFENSE RESEARCH SCIENCES[1]	43.0
63253F	ADVANCED SYSTEM INTEGRATION DEMONSTRATION	29.0
63203F	ADVANCED AVIONICS FOR AIRCRAFT	25.3
63250F	LINCOLN LABORATORY	25.1
63718F	ELECTRONIC WARFARE TECHNOLOGY	24.7
63743F	ELECTRO OPTICAL WARFARE	20.7
63750F	COUNTER/COUNTERMEASURES ADVANCED DEVELOPMENT	10.6
63208F	RECONNAISSANCE SENSORS/PROCESSING TECHNOLOGY	7.7
63728F	ADVANCED COMPUTER TECHNOLOGY	6.9
63103F	ADVANCED AIRBORNE RADAR DEVELOPMENT	4.2
61101F	IN-HOUSE LAB INDEPENDENT RESEARCH[2]	3.2
63259F	CATOGRAPHIC APPLICATION FOR TAC & STRAT SYS	1.3
	17% WEAPONRY ($221.0M)	
63605F	ADVANCED RADIATION TECHNOLOGY	$ 82.5
62601F	ADVANCED WEAPONS[4]	42.3
62602F	CONVENTIONAL MUNITIONS	40.8
63601F	CONVENTIONAL WEAPONS TECHNOLOGY	32.0
61102F	DEFENSE RESEARCH SCIENCES[1]	19.9
61101F	IN-HOUSE LAB INDEPENDENT RESEARCH[2]	2.5
63363F	HYPERVELOCITY MISSILE	1.0
	14% PROPULSION ($175.7M)	
62203F	AEROSPACE PROPULSION	$ 56.4
62302F	ROCKET PROPULSION	35.2
63202F	AIRCRAFT PROPULSION SUBSYSTEM INTEGRATION	27.0
63216F	ADVANCED TURBINE ENGINE GAS GENERATOR	26.9
61102F	DEFENSE RESEARCH SCIENCES[1]	20.8
63215F	AVIATION TURBINE FUEL TECHNOLOGY	5.0
63302F	ADVANCED MISSILE PROPULSION	3.3
61101F	IN-HOUSE LAB INDEPENDENT RESEARCH[2]	1.1

11% FLIGHT VEHICLES ($137.5M)

62201F	AEROSPACE FLIGHT DYNAMICS	$ 61.2
61102F	DEFENSE RESEARCH SCIENCES[1]	25.0
63245F	ADVANCED FIGHTER TECHNOLOGY INTEGRATION	19.5
63211F	AEROSPACE STRUCTURES AND MATERIALS[3]	15.5
63205F	FLIGHT VEHICLE TECHNOLOGY	15.0
61101F	IN-HOUSE LAB INDEPENDENT RESEARCH[2]	1.3

10% PEOPLE ($126.1M)

62202F	AEROSPACE BIOTECHNOLOGY	$ 43.6
62205F	TRAINING AND SIMULATION TECHNOLOGY	22.5
61102F	DEFENSE RESEARCH SCIENCES[1]	16.8
62703F	PERSONNEL UTILIZATION TECHNOLOGY	8.2
63231F	CREW SYSTEMS TECHNOLOGY	7.9
63227F	ADVANCED SIMULATOR TECHNOLOGY	6.7
63751F	INNOVATIONS IN EDUCATION & TRAINING	6.1
63106F	LOGISTICS R&D REQUIREMENTS	5.3
63745F	CHEMICAL WARFARE DEFENSE	4.6
61101F	IN-HOUSE LAB INDEPENDENT RESEARCH[2]	2.6
63704F	MANPOWER PERSONNEL SYSTEM TECHNOLOGY	1.8

6% MATERIALS ($84.7M)

62102F	MATERIALS	$ 47.6
61102F	DEFENSE RESEARCH SCIENCES[1]	28.6
63211F	AEROSPACE STRUCTURES & MATERIALS[3]	7.3
61101F	IN-HOUSE LAB INDEPENDENT RESEARCH[2]	1.2

6% ENVIRONMENT ($79.6M)

62101F	GEOPHYSICS	$ 40.6
61102F	DEFENSE RESEARCH SCIENCES[1]	26.8
63723F	CIVIL/ENVIRONMENTAL ENGINEERING TECHNOLOGY	5.0
62601F	ADVANCED WEAPONS[4]	3.4
63410F	SPACE SYSTEMS ENVIRON INTERACTIONS TECH	2.6
61101F	IN-HOUSE LAB INDEPENDENT RESEARCH[2]	1.2

TOTAL TECHNOLOGY BASE $ 1,290.9M

NOTES:

[1] TOTAL DEFENSE RESEARCH SCIENCES IS $180.9M
[2] TOTAL IN-HOUSE LAB INDEPENDENT RESEARCH IS $13.1M
[3] TOTAL AEROSPACE STRUCTURES & MATERIALS IS $22.8M
[4] TOTAL ADVANCED WEAPONS IS $45.7M

GLOSSARY

AACE	Aircraft Alerting Communications Electromagnetic Pulse
ACM	Advanced Cruise Missile
ACS	Acquisition and Command Support
AFSATCOM	Air Force Satellite Communications
AFTI	Advanced Fighter Technology Integration
AI	Artificial Intelligence
ALCM	Air Launched Cruise Missile
AMRAAM	Advanced Medium Range Air-to-Air Missile
APSI	Aircraft Propulsion Subsystem Integration
ASARS	Advanced Synthetic Aperture Radar System
ASAT	Antisatellite
ASPJ	Airborne Self-Protection Jammer
ASRAAM	Advanced Short Range Air-to-Air Missile
ASTF	Aeropropulsion Systems Test Facility
ATB	Advanced Technology Bomber
ATE	Automatic Test Equipment
ATEGG	Advanced Turbine Engine Gas Generator
ATFT	Advanced Tactical Fighter Technology
AWACS	Airborne Warning and Control System

BLSS	Base Level Self-Sufficiency
BMEWS	Ballistic Missile Early Warning System

C^3	Command, Control and Communications
CADIN	Continental Air Defense Integration North
CIP	Component Improvement Program
COMSEC	Communications Security
CONUS	Continental United States
CRAF	Civil Reserve Air Fleet
CSB	Closely Spaced Basing
CSOC	Consolidated Space Operations Center
CSRL	Common Strategic Rotary Launcher
CSW	Conventional Standoff Weapon

DEEC	Digital Electronic Engine Control
DEW	Distant Early Warning
DMSP	Defense Meteorological Satellite Program
DOD	Department of Defense
DSCS	Defense Satellite Communications System
DSP	Defense Support Program
DT&E	Development, Test and Evaluation

ECCM	Electronic Counter-Countermeasures
ECM	Electronic Countermeasures
EDS	European Distribution System
EDSA	European Distribution System Aircraft
EHF	Extremely High Frequency

EMDP	Engine Model Derivative Program
EMP	Electromagnetic Pulse
FLTSATCOM	Fleet Satellite Communications
GCI	Ground Controlled Intercept
GLCM	Ground Launched Cruise Missile
GPS	Global Positioning System
GPSPAC	Global Positioning System Receiver/Processor
GWEN	Groundwave Emergency Network
HARM	High Speed Anti-Radiation Missile
HF	High Frequency
ICAM	Integrated Computer Aided Manufacturing
ICBM	Intercontinental Ballistic Missile
I&M	Improvement and Modernization
IIR	Imaging Infrared
IMIP	Industrial Modernization Incentives Program
IOC	Initial Operational Capability
IONDS	Integrated Operational Nuclear Detonations Detection System
IOT&E	Initial Operational Test and Evaluation
IUS	Inertial Upper Stage
Joint STARS	Joint Surveillance and Target Attack Radar System
JSC	Johnson Space Center
JTACMS	Joint Tactical Missile System
JTIDS	Joint Tactical Information Distribution System
JVX	Joint Service Vertical Lift Aircraft Development Program
LAD	Low Altitude Delivery
LANTIRN	Low Altitude Navigation and Targeting Infrared System for Night
LCC	Launch Control Center
LF	Low Frequency
LLLGB	Low Level Laser Guided Bomb
LOCPOD	Low Cost Powered Dispenser
LRSOM	Long Range Stand-Off Missile
MAC	Military Airlift Command
MANTECH	Manufacturing Technology
MATE	Modular Automatic Test Equipment
MCE	Modular Control Equipment
MEECN	Minimum Essential Emergency Communications Network
MESP	Minuteman Extended Survivable Power
MLS	Microwave Landing System
MOU	Memorandum of Understanding
MRASM	Medium Range Air-to-Surface Missile
MRT	Miniature Receive Terminal

MSIP	Multinational Staged Improvement Program
MSSTM	Military Space Systems Technology Model
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NCA	National Command Authority
NGT	Next Generation Trainer
NUDET	Nuclear Detonation
OFT	Operational Flight Trainer
OSD	Office of Secretary of Defense
OTH-B	Over-the-Horizon-Backscatter
OWRM	Other War Reserve Materiel
PAM-D	Payload Assist Modules-Delta
P^3I	Pre-Planned Product Improvement
PLSS	Precision Location Strike System
POS	Peacetime Operating Stock
RAF	Royal Air Force
R&D	Research and Development
RDF	Rapid Deployment Force
RDT&E	Research, Development, Test and Evaluation
RF	Radio Frequency
R&M	Reliability and Maintainability
SAC	Strategic Air Command
SACDIN	Strategic Air Command Digital Network
SAW	Standoff Attack Weapon
SCF	Satellite Control Facility
SDS	Satellite Data System
SHF	Super High Frequency
SINCGARS-V	Single Channel Ground and Airborne Radio System-Very High Frequency
SLBM	Submarine-Launched Ballistic Missile
SOC	Satellite Operations Complex
SOPC	Shuttle Operations and Planning Center
SRAM	Short-Range Attack Missile
SRARM	Short Range Anti-Radiation Missile
STC	Satellite Test Center
STP	Space Test Program
STS	Space Transportation System
TAOC	Tactical Air Operations Central
TACS	Tactical Air Control System
TADIL-J	Tactical Digital Information Link
TECH BASE	Technology Base
TECH MOD	Technology Modernization
TEL	Transporter-Erector-Launcher
TRI-TAC	Joint Tactical Communications
TV	Television

UHF	Ultra High Frequency
USAFE	United States Air Forces in Europe
VHF	Very High Frequency
VHSIC	Very High Speed Integrated Circuits
VLF	Very Low Frequency
VTOL	Vertical Take Off and Landing
WAAM	Wide Area Antiarmor Munitions
WRM	War Reserve Materiel
WRSK	War Readiness Spares Kits

(Whereupon, at 11:20 a.m., the subcommittee proceeded to other business.)

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1984

TUESDAY, MARCH 22, 1983

U.S. SENATE,
SUBCOMMITTEE ON TACTICAL WARFARE,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

AIR FORCE TACTICAL PROGRAMS

The subcommittee met in executive session, pursuant to notice, at 8:55 a.m., in room SR–232A, Russell Senate Office Building, Senator Barry Goldwater (chairman) presiding.

Present: Senators Goldwater, Warner, Wilson, Levin, and Kennedy.

Staff present: Carl M. Smith and Robert S. Dotson, professional staff members; and Tamara L. Farnsworth, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; John Campbell, assistant to Senator Warner; Jon Etherton, assistant to Senator Jepsen; Peter Lennon, assistant to Senator Levin; and Matthew Murray, assistant to Senator Kennedy.

OPENING STATEMENT BY SENATOR BARRY GOLDWATER, CHAIRMAN

Senator **GOLDWATER**. The subcommittee will come to order. We have a meeting in Commerce this morning on communications and that is another one of my subcommittees. So, we will go along until they call me. If I have to leave, the staff will take over. So, you can continue in any way that you want to, General. The hearing this morning will be a continuation of yesterday's hearing. General Skantze, where did we leave off?

STATEMENT OF LT. GEN. LAWRENCE A. SKANTZE, USAF, DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT AND ACQUISITION, ACCOMPANIED BY MAJ. GEN. WILLIAM. A. GORTON, USAF, DIRECTOR OF OPERATIONAL REQUIREMENTS; MAJ. GEN. JAMES H. MARSHALL, USAF, DIRECTOR OF DEVELOPMENT AND PRODUCTION; AND BRIG. GEN. THOMAS A. BAKER, USAF, DEPUTY DIRECTOR OF OPERATIONS

General **SKANTZE**. Mr. Chairman, we left off at the MRASM program, so we will start there.

Senator **GOLDWATER**. What?

General **SKANTZE**. Medium range air-to-surface missile, MRASM.

Senator **GOLDWATER**. Oh, yes.

General Skantze.

[The prepared statement of Lt. Gen. Lawrence Skantze follows:]

Prepared Statement of Lt. Gen. Lawrence Skantze, Deputy Chief of Staff for Research, Development and Acquisition, U.S. Air Force

FISCAL YEAR 1984 TACTICAL AIR STATEMENT

Mr. Chairman and Members of the Committee, it is a pleasure to present the Tactical Air Warfare portion of the fiscal year 1984 Budget Request for Research, Development, Test and Evaluation (RDT&E) and Procurement in support of our Tactical Air Forces.

The major threat facing our Tactical Air Forces continues to be the numerically superior forces of the Soviet Union/Warsaw Pact. Western strategy has relied heavily on technological superiority to offset this quantitative advantage. However, massive Soviet investment has substantially eroded our qualitiative advantage. To meet the Soviet challenge, our goal is a balanced plan to improve the readiness and sustainability of our current forces while modernizing to maintain our qualitative edge.

The fiscal year 1984 budget raises F-15 production to the more efficient rate of 48 aircraft per year and provides for advance procurement to support production of 72 aircraft in 1985, an even more efficient rate. We plan to continue to procure F-15s to sustain and modernize our Tactical Air Forces, reach force structure goals, and correct deficiencies in the Strategic Air Defense force.

We are continuing to procure the AIM-7 and AIM-9 air-to-air missiles through this year. The Advanced Medium Range Air-to-Air Missile, the AIM-120, will provide a significantly improved performance envelope, increased average velocity and a launch and maneuver capability. We are requesting funds this year to procure long-lead items for the AIM-120.

To achieve superiority over the expected Soviet fighter development, we are pursuing the Advanced Tactical Fighter Technologies (ATFT) Program. This development will take advantage of technical opportunities in the development of airframe and flight controls, engine, avionics, weapons integration, support-ability, and manufacturing technology for increased efficiency, capability and affordability. The fiscal year 1984 RDT&E request is for continuation of engine and airframe technology and concept development activities.

We plan to buy 120 F-16s in fiscal year 1984 as part of a four year (480 aircraft) multiyear procurement contract. The F-16, however, has limited night/under-the-weather attack capability. This limitation will be corrected by radar improvements and incorporation of the LANTIRN system as part of the Multinational Staged Improvement Plan (MSIP).

We are improving existing weapons such as the GBU-15 and Maverick missile and a variation of the Laser Guided Bomb for delivery at low altitudes. These efforts will improve accuracy, reduce aircraft exposure to surface-to-air threats and enhance tactical flexibility.

Maverick is the Air Force's primary tactical air-to-surface missile. In fiscal year 1984 we will buy 2,600 Imaging Infrared (IIR) guided Maverick missiles to expand our ability to destroy small, hard tactical targets during night and limited visibility conditions.

One of our most serious deficiencies is our inability to effectively attack targets at night and in adverse weather. One significant step for our single seat A-10 and F-16 fighters and the F-15 and F-16 derivative aircraft is the LANTIRN system which is now being developed. Fiscal year 1984 funds will be used to continue flight test of the LANTIRN navigation and targeting pods and to initiate production readiness for the navigation pod.

The Joint STARS is multimode radar system that provides an integrated approach to real-time detection and attack of second echelon targets. Joint STARS is a joint program with Air Force lead that merges the technologies of the PAVE MOVER Engagement System and the Army Battlefield Data System offers the potential to delay, disrupt, or destroy massed Warsaw Pact ground forces.

Fiscal year 1984 funds are also requested to develop the Joint Tactical Missile System (JTACMS) with the Army. The JTACMS will provide sufficient standoff capability to allow delivery aircraft to remain outside the threat envelopes of the target area. We are also designing JTACMS for compatibility with other systems, such as PLSS.

The Standoff Attack Weapon (SAW) program, a new start in fiscal year 1984, will address the essential requirement of attacking high value targets while maintaining acceptable levels of attrition. SAW is a powered, inertially guided dispenser that will deliver existing or programmed submunitions against a variety of targets.

The most serious Tactical Air Forces' deficiency is our limited ability to perform all-weather, day and night interdiction. Currently, only the fully committed and decreasing F-111 force has this capability. Additional aircraft are needed to augment the F-111 in the long-range interdiction mission. Derivatives of the F-15 and F-16 will offer significant improvements in range, payload and the ability to operate at night and under the weather on interdiction missions while retaining their capability to perform the all-weather, air superiority mission.

We are evaluating and conducting a flight demonstration of the F-15 and F-16XL aircraft to investigate several potential capability improvements which could be achieved through design and/or avionics modifications to fulfill the requirments for the long-range interdiction missions. The results of this demonstration will be presented to the Congress during 1983.

Our central effort for improving our long-term strike capability against emitters is the Precision Location Strike System (PLSS). PLSS is a near-real-time, all weather, day and night system which will give us the capability to precisely locate and strike tactical targets throughout the theater area.

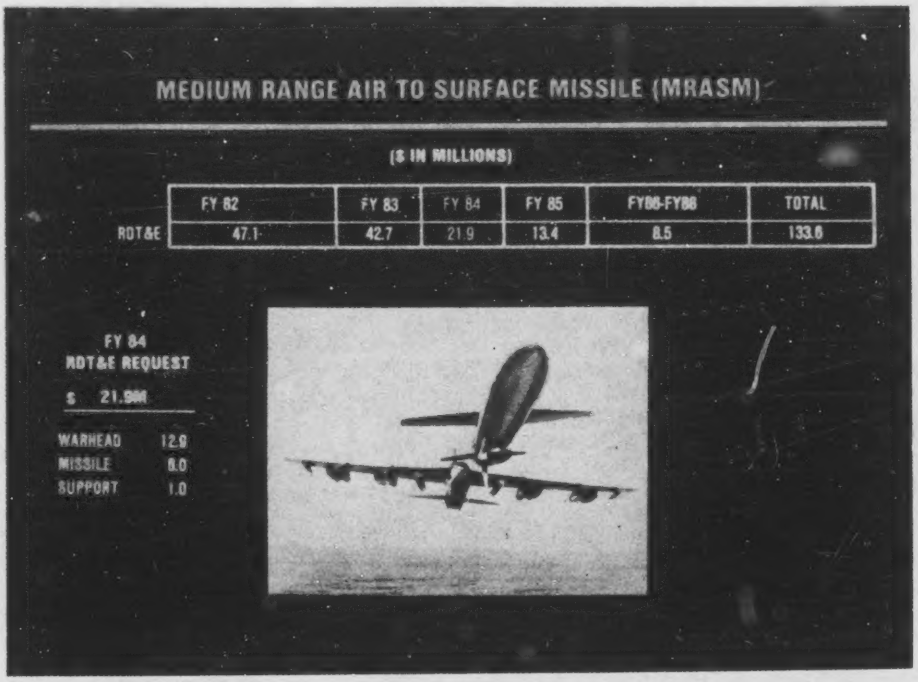
We are also continuing with the Navy in the joint acquisition of the High Speed Anti-Radiation Missile (HARM), which will greatly improve the lethality of the F-4G. HARM will be used against surface-to-air missile guidance radars and early waring radars, as well as air defense radars.

The Compass Call system uses off-the-shelf equipment and technology to modify ten existing C-130 aircraft. In fiscal year 1984 we will continue our modification program and develop improvements to the baseline Compass Call systems.

Mr. Chairman, this concludes my statement. In summary, our Tactical Air Forces face a serious challenge today. The unprecedented Soviet military buildup and modernization efforts are a clear indication of their objective to achieve worldwide domination and military superiority. Our budget has been formulated to strike a balance between readiness and modernization so that we can fight with today's forces as well as meet tomorrow's threat. Our tactical RDT&E and procurement programs are a result of careful deliberations to reconcile competing alternatives within the overall Air Force set of priorities: strategic nuclear modernization, readiness and sustainability for general purposes forces, increase airlift, and modernize and expand the tactical forces. I believe the program presented to you today represents the best utilization of scarce defense dollars to support the Air Force and our overall national defense program. I strongly urge your support of the RDT&E and procurement programs.

General SKANTZE. We will start with General Gorton.

General GORTON. Mr. Chairman, this is a long-range conventional standoff candidate. It is a missile designed to go as much as [deleted] nautical miles.



MEDIUM RANGE AIR TO SURFACE MISSILE (MRASM)

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E	47.1	42.7	21.9	13.4	8.5	133.6

FY 84
RDT&E REQUEST

$ 21.9M

WARHEAD	12.9
MISSILE	8.0
SUPPORT	1.0

As you recall, we had some concern about this weapon over the past, principally for two reasons. The submunition, selection of a submunition for the weapon, and affordability. We recently have looked at a number of submunitions and have selected a submunition for MRASM. So, today, the program is fully funded for RDT&E as well as the production funding and the integration funding necessary to integrate this system on the B-52.

Senator GOLDWATER. Does this carry a nuclear warhead?

General GORTON. It does not, sir. It is a conventional standoff.

Senator GOLDWATER. Could it?

General GORTON. No. It, in fact, would be designed so that it could not. Its range is limited so it would not be confused with an ALCM.

Senator GOLDWATER. You mentioned submunition, which one?

General GORTON. It is a recent selection. We completed a number of submunitions, getting down to two basic submunitions which were designed for airfield attack. The two munitions looked at in the final evaluation were a German munition called STABO and a U.S. munition called BKEP—Booted Kinetic Energy Penetrator. We selected BKEP and we have just this month let a full-scale engineering development contract for BKEP. The weapon (MRASM) will dispense up to 28 submunitions as it flies across the runway and penetrate the concrete through boosted kinetic energy.

Senator GOLDWATER. Can this be carried by a F-111?

General GORTON. At the present time there is no requirement for the MRASM from the tactical Air Forces. However, Strategic Air Command has stated a very strong requirement and at the present time we are only planning to integrate it on the B-52.

Senator **Goldwater**. I have been thinking of interdiction which the F-111 is well suited for.

General **Gorton**. Yes, sir.

General **Skantze**. I think the tactical Air Forces have some concern for the unit cost. It looks like the missile may be as much as $2.5 million apiece. So, that gets to be an expensive load out. So, they have been reluctant to commit to it.

Senator **Goldwater**. Who is making that?

General **Gorton**. General Dynamics.

General **Skantze**. General Dynamics. It is a derivative of the Tomahawk.

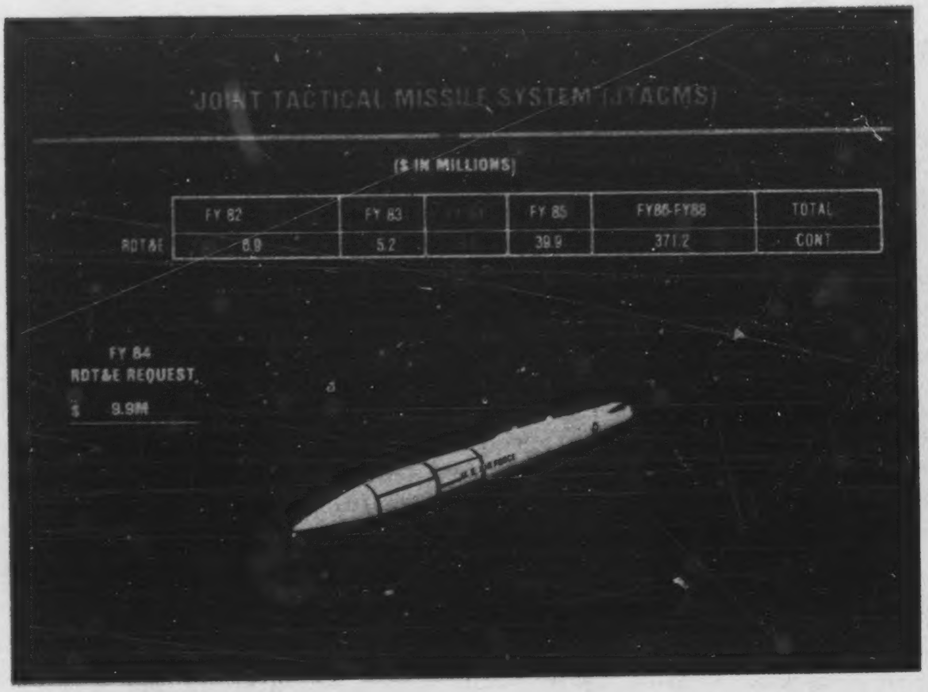
Senator **Goldwater**. Why is SAC not concerned about cost?

General **Gorton**. They are, Mr. Chairman. There is a legitimate Air Force concern for the munition and we have always stated that. We will continue to proceed with development. This 1984 money will buy the first integrated test vehicle. We are going to evaluate the system when we finally integrate the submunition and the missile and take another look at it at that time.

Senator **Goldwater**. All right.

General **Gorton**. The next munition we will look at is the joint tactical missile system, or called Jtacms. This is a new program, Mr. Chairman, that brought together two separate programs, an Army program called corps support weapon system and an Air Force program called conventional standoff weapon.

The objective of this program is to devise a conventional standoff weapon that has the highest communality between both Army and Air Force requirements for attack of the second echelon and other interdiction targets.



JOINT TACTICAL MISSILE SYSTEM (JTACMS)

($ IN MILLIONS)

	FY 82	FY 83		FY 85	FY86-FY88	TOTAL
RDT&E	8.9	5.2		39.9	371.2	CONT

FY 84
RDT&E REQUEST
$ 9.9M

At the present time, we are providing funds for concept validation and we hope to be able to make a decision jointly to go forward with full-scale engineering development at the soonest opportunity. The Army is the lead service on this program and basically we are just on concept validation at this stage.

Senator GOLDWATER. Well, is not the Secretary of Defense insisting on one weapon for both services of this type?

General GORTON. Our guidance, sir, in working with the Army is to develop a weapon that has the highest commonality. It is desired, if we could, to build one weapon. However, the requirements of the two services, one to ground launched in the Army and another to be air launched in the Air Force, make that a very difficult task.

Senator GOLDWATER. Very near impossible.

General SKANTZE. We are in the process with the Army of trying to finalize a joint statement of requirements. That will not be done until June. It looks like it is going to be about a 3,300-pound missile which is a fair load for an F-16.

Senator GOLDWATER. What is the range going to be?

General GORTON. The range on that missile will be similar to MRASM, initially looking for [deleted] nautical miles for the Air Force.

Senator GOLDWATER. And what guidance system would you have for both of these?

General GORTON. That has not been decided yet, sir. That is part of our concept validation. Some of the systems being looked at would be inertial guidance only. That would get you a rather large

CEP. Other systems being looked at are trying it to PLSS or joint stars for final terminal guidance.

Senator **Goldwater**. Do you think we need both MRASM and JTACMS?

General **Gorton**. There is an issue involved in that, as JTACMS evolves, as we get a better definition of what it can be, then that is a consideration because certainly we do not want to duplicate any capability we might have in MRASM.

Senator **Goldwater**. From just real quick listening it sounds to me like there will be duplication. If you do not have to have it, let us not fool with it.

General **Skantze**. I think you are correct, Mr. Chairman, I do not think we have that sorted out yet. We will not know until we find out.

Senator **Goldwater**. You have no preference yet.

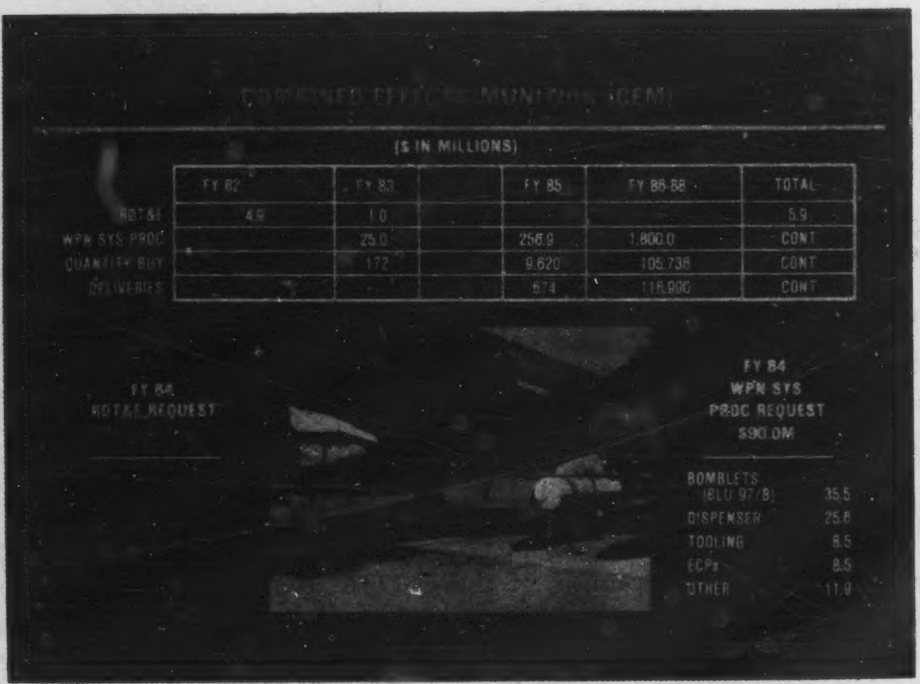
General **Skantze**. No. Once we see what we have in terms of the joint requirement by June, looking at that and looking at what the MRASM would do, we will be in a better position to make that judgment.

General **Gorton**. The next program we will look at, Mr. Chairman, is a cluster munition, combined effects munition.

Senator **Goldwater**. I have seen this.

General **Gorton**. Yes, sir.

Senator **Goldwater**. It is a fine weapon.



COMBINED EFFECTS MUNITIONS (CEM)

($ IN MILLIONS)

	FY 82	FY 83		FY 85	FY 86-88	TOTAL
RDT&E	4.9	1.0				5.9
WPN SYS PROC		25.0		256.9	1,800.0	CONT
QUANTITY BUY		172		9,620	105,738	CONT
DELIVERIES				674	116,900	CONT

FY 84
RDT&E REQUEST

FY 84
WPN SYS
PROC REQUEST
$90.0M

BOMBLETS (BLU 97/B)	35.5
DISPENSER	25.6
TOOLING	8.5
ECPs	8.5
OTHER	11.9

General **Gorton**. We are in procurement on this now and it provides both fragmentary, incendiary and light antiarmor capability.

Mr. **Smith**. What is the unit cost on that, sir?

General **Gorton**. I can get you that. I do not have a unit cost on the bomblet per se, Mr. Chairman, but we can get that for the record.

Senator **Goldwater**. Would you, please? Could you make a guess at it, approximate, just so we would know?

General **Gorton**. Somewhere in the $50 range I am advised, Mr. Chairman.

Senator **Goldwater**. In that what?

General **Gorton**. In the $50 range.

[The information follows:]

BOMBLET, COMBINED EFFECTS MUNITION

The average unit cost of the bomblets used in the Combined Effects Munition (CEM) is $29 in fiscal year 1981 dollars or approximately $40 in then year dollars. (This covers fiscal year 1983-88 procurement.)

General **Marshall**. It is just a little more expensive than Rockeye. I think Rockeye runs about $40.

General **Skantze**. I think the individual dispenser, fully loaded, would be about $20,000.

Senator **Goldwater**. Well, get it for the record.

General **Skantze**. Yes, sir.

Senator **Goldwater**. Who is making that?

General **Marshall**. Aerojet is the prime and we are talking about bringing Honeywell in as a second source.

Senator **Goldwater**. Do you have any other type of bomblets, other than the ones we saw demonstrated at Eglin, which were explosive? I think some of them were delayed. Some would, I think, lay on the ground and then would explode.

General **Gorton**. That is the GATOR.

General **Skantze**. That is the GATOR mine that lays on the ground. We covered that yesterday. That is the one where the tank was rolling over the mine field.

Senator **Goldwater**. I thought this weapon had some instantaneous fusing and delayed fusing.

General **Gorton**. There is a program under development called ERAM that has two factors. It puts out a mine that has sensor that senses an armored target and fires a fragmentary warhead. That is the system under development,

Senator **Goldwater**. All right.

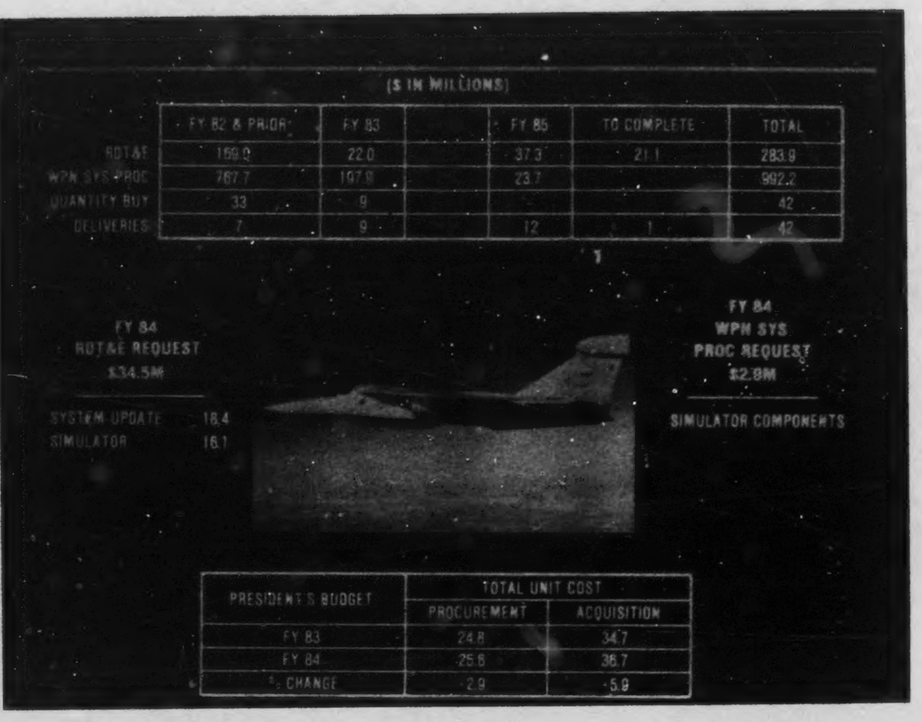
General **Gorton**. We will now turn to the category of defense suppression and electronic warfare, Mr. Chairman.

The first program we will look at is the EF-111. The EF-111, as you know, is an adaptation of the F-111A. It represents our only system for providing corridor and barrage standoff jamming.

Senator **Goldwater**. You still only have one of these aircraft?

General **Gorton**. No, sir. We now have delivered to Mountain Home, which is the first operational location for the EF-111, I believe nine. They are just coming in.

General **Skantze**. I think we will have about 10 there by next month, out of the 42. But they are fully funded and under production.



($ IN MILLIONS)

	FY 82 & PRIOR	FY 83		FY 85	TO COMPLETE	TOTAL
RDT&E	159.0	22.0		37.3	21.1	283.9
WPN SYS PROC	767.7	197.9		23.7		992.2
QUANTITY BUY	33	9				42
DELIVERIES	7	9		12	1	42

FY 84
RDT&E REQUEST
$34.5M

SYSTEM UPDATE	18.4
SIMULATOR	16.1

FY 84
WPN SYS
PROC REQUEST
$2.8M

SIMULATOR COMPONENTS

PRESIDENT'S BUDGET	TOTAL UNIT COST	
	PROCUREMENT	ACQUISITION
FY 83	24.8	34.7
FY 84	25.6	36.7
% CHANGE	+2.9	+5.8

General Gorton. Part of the RDT&E money associated with this program is to make software updates to make the jamming system able of handling the latest Soviet threat.

Senator Goldwater. Has this weapon proven to be everything you have wanted?

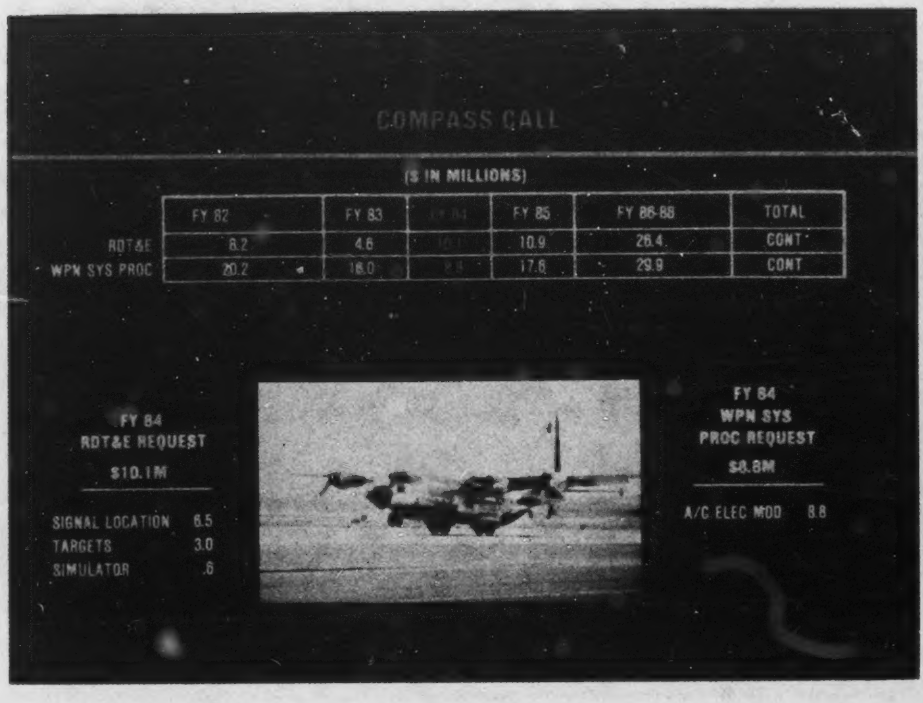
General Skantze. I think it does a very good job on the standoff jamming. It is going to be a major adjunct to the forces in Europe. I think that we do have to upgrade the capability because the technology and the threat that it was designed against was done back in 1974. So, we have to make some improvements to it. Those are funded and we also have a special SAB group looking at it that will do those upgrades.

Senator Goldwater. Does this jam just communications or will it jam SAM's, for example?

General Skantze. It jams acquisition, early warning radar. So that the SAM's are totally lost for initial acquisition and direction as to where to find them. As you know, SAM's tend to be short range. It primarily jams the acquisition in the early warning radars.

General Gorton. We believe this system in conjunction with Compass Call, which will be jamming [deleted] and PLSS, which will be able to pinpoint the exact location of the emitters, those three systems working together will provide us an excellent capability to take down the SAM nets.

Our next program is the Compass Call aircraft. It is a modified C-130. [Deleted.]



COMPASS CALL

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
RDT&E	8.2	4.6	10.1	10.9	26.4	CONT
WPN SYS PROC	20.2	18.0	8.8	17.6	29.9	CONT

FY 84
RDT&E REQUEST
$10.1M

SIGNAL LOCATION	6.5
TARGETS	3.0
SIMULATOR	.6

FY 84
WPN SYS
PROC REQUEST
$8.8M

A/C ELEC MOD	8.8

Senator **Goldwater**. Can you handle satellite communication? Could you jam satellite communications?

General **Skantze**. No.

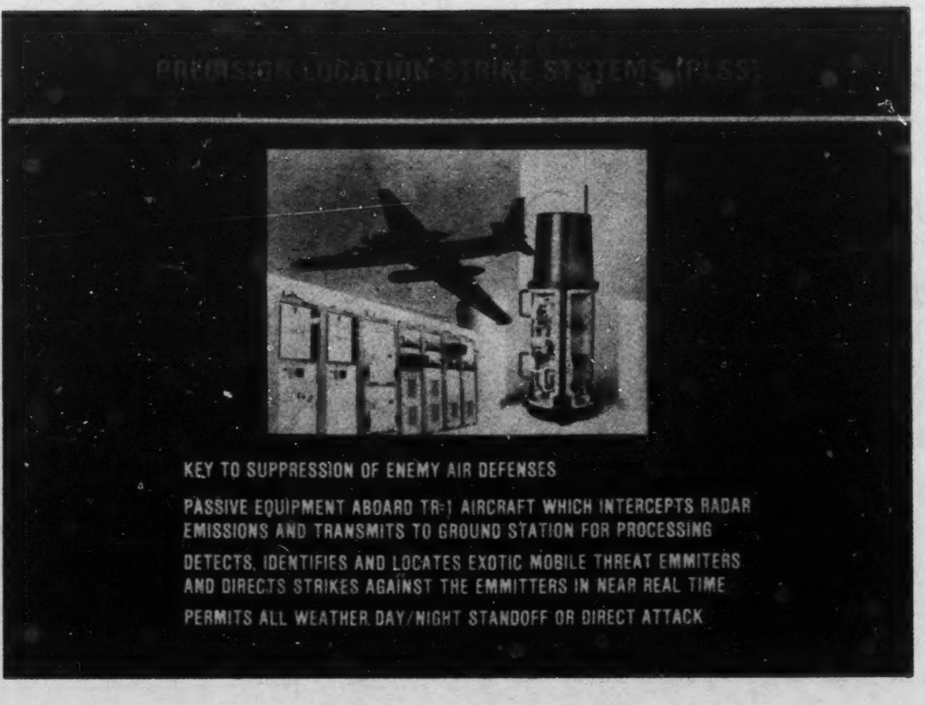
General **Gorton**. No, sir.

General **Skantze**. It is being designed against [deleted].

Senator **Goldwater**. Is anybody working on jamming the satellites from aircraft?

General **Skantze**. Not to my knowledge.

Senator **Goldwater**. That should not be too hard. That is something to think about when you have nothing else to worry about.



PRECISION LOCATION STRIKE SYSTEMS (PLSS)

KEY TO SUPPRESSION OF ENEMY AIR DEFENSES

PASSIVE EQUIPMENT ABOARD TR-1 AIRCRAFT WHICH INTERCEPTS RADAR EMISSIONS AND TRANSMITS TO GROUND STATION FOR PROCESSING

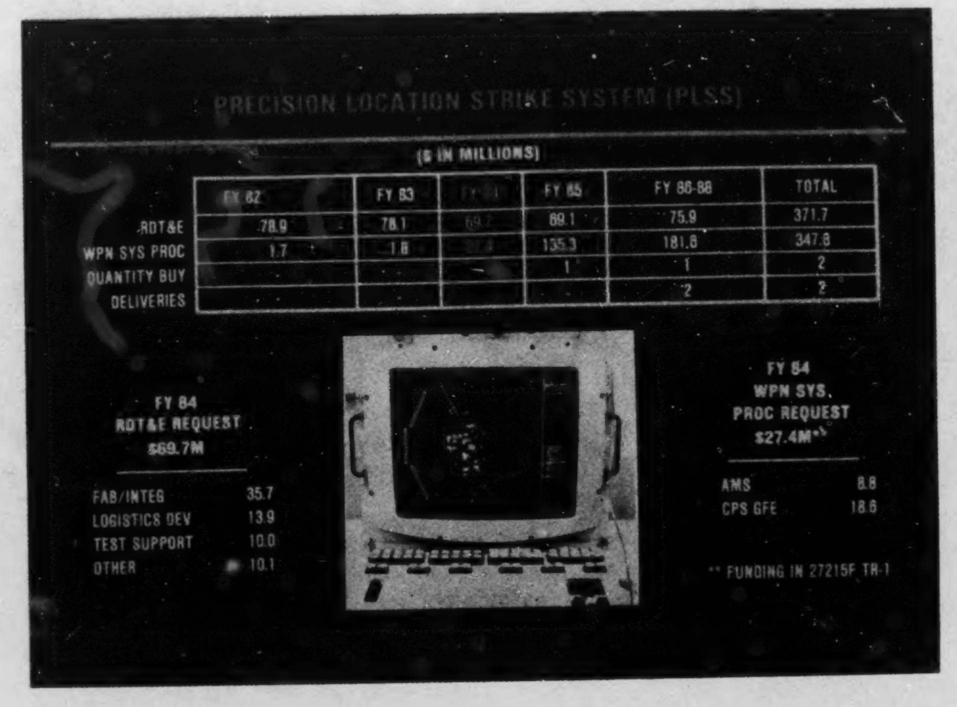
DETECTS, IDENTIFIES AND LOCATES EXOTIC MOBILE THREAT EMMITERS AND DIRECTS STRIKES AGAINST THE EMMITTERS IN NEAR REAL TIME

PERMITS ALL WEATHER DAY/NIGHT STANDOFF OR DIRECT ATTACK

General GORTON. The next program that we will look at is the precision location strike system as we briefed in the overview yesterday, Mr. Chairman. This system does two things. The first thing it does is, it provides the commander in the field with an instantaneous electronic order of battle. That is very essential if we are to know where the SAM's are either to kill them, or to avoid them.

Also, with this system is the capability to provide direction to the fighter aircraft to attack the SAM batteries, or possibly to direct a separate missile to the SAM battery.

Senator GOLDWATER. What is the status of the PLSS procurement program?



PRECISION LOCATION STRIKE SYSTEM (PLSS)

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
RDT&E	78.9	78.1	69.7	69.1	75.9	371.7
WPN SYS PROC	1.7	1.8	27.4	135.3	181.6	347.8
QUANTITY BUY			—	1	1	2
DELIVERIES					2	2

FY 84
RDT&E REQUEST
$69.7M

FAB/INTEG	35.7
LOGISTICS DEV	13.9
TEST SUPPORT	10.0
OTHER	10.1

FY 84
WPN SYS.
PROC REQUEST
$27.4M**

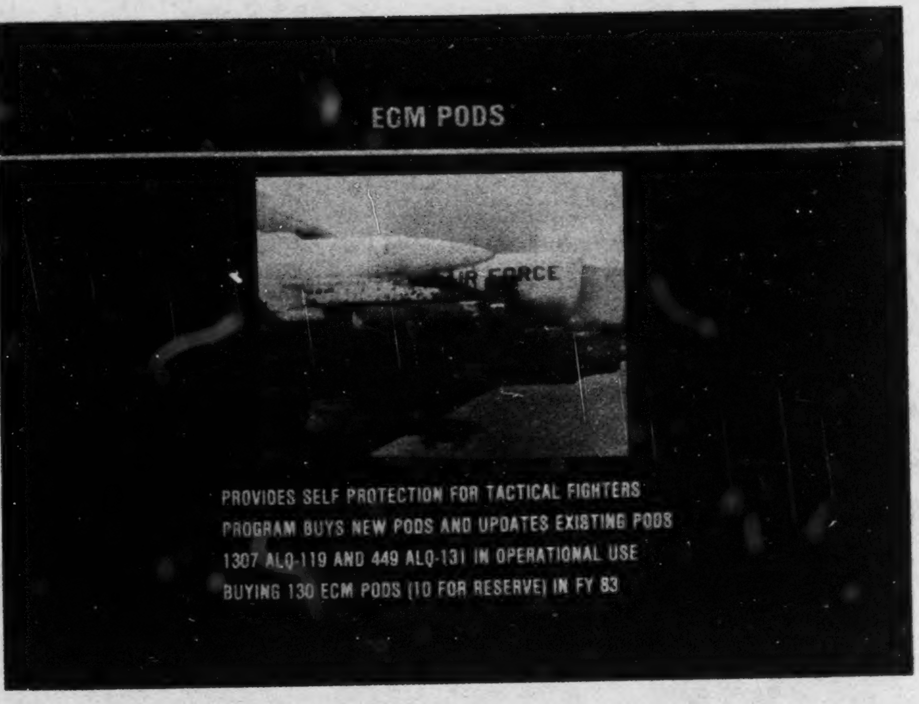
AMS	8.8
CPS GFE	18.6

** FUNDING IN 27215F TR-1

General GORTON. At the present time, in the 1984 budget we are asking for 35 aircraft and that is a mixture. The TR–1 aircraft is the platform for the PLSS system. The PLSS system is really a set of sensors that go on the TR–1 aircraft as well as a ground processing station and beacons. There are other sensors that are interchangeable with PLSS on the TR–1 aircraft, ASARS, which is a radar reconnaissance system as well as ELINT collectors that provide us the detailed information on the signal of the SAM so that we can program our fighter aircraft Pods to be able to jam the SAM system.

Those two specific aspects to the sensors, one that reads the character of the signal so we can take it apart and program our Pods is different than the PLSS system which immediately gives you real time location information so the battle commander will know exactly where they are. There are 35 TR–1 aircraft in the program.

Senator GOLDWATER. All right.



ECM PODS

PROVIDES SELF PROTECTION FOR TACTICAL FIGHTERS
PROGRAM BUYS NEW PODS AND UPDATES EXISTING PODS
1307 ALQ-119 AND 449 ALQ-131 IN OPERATIONAL USE
BUYING 130 ECM PODS (10 FOR RESERVE) IN FY 83

General **Gorton**. Turning now the ECM Pods which our fighter aircraft carry. We are procuring ALQ-131 Pods, our latest Pod and updating some of the older Pods with this program.

Senator **Goldwater**. Is there any way these Pods could eventually be internally constructed, put in the fuselage?

General **Gorton**. Yes, Mr. Chairman. In fact, there are two ways to approach that. One is with a program called ASPJ which will be integrated into F-16's as they come off the line. That provides you an internal jamming capability as opposed to Pods which take up stations, which you could carry munitions on and also add to drag of the aircraft which reduces their range somewhat. So, we do have a program for internal jamming.

Senator **Goldwater**. That is an awfully big Pod for the job it is assigned to do. I have a hunch that would take a lot of empty room in there.

General **Skantze**. No, it is pretty well filled up. But you raise a good point. As you know, we have a mixture, the F-16 has an internal system. A part of the F-16's will not have the airborne Self-Protection Jammer. It is not something you can easily go back and retrofit, though it will be in most of the F-16's.

The Pods, I think, are certainly a terrible burden if you are trying to do air-to-air. It does at least offer us the flexibility of being able to use them on F-4's and A-10's, and F-16's.

Senator **Goldwater**. Is this system used against the SAM?

General **Gorton**. Yes, sir. Primarily against SAM's.

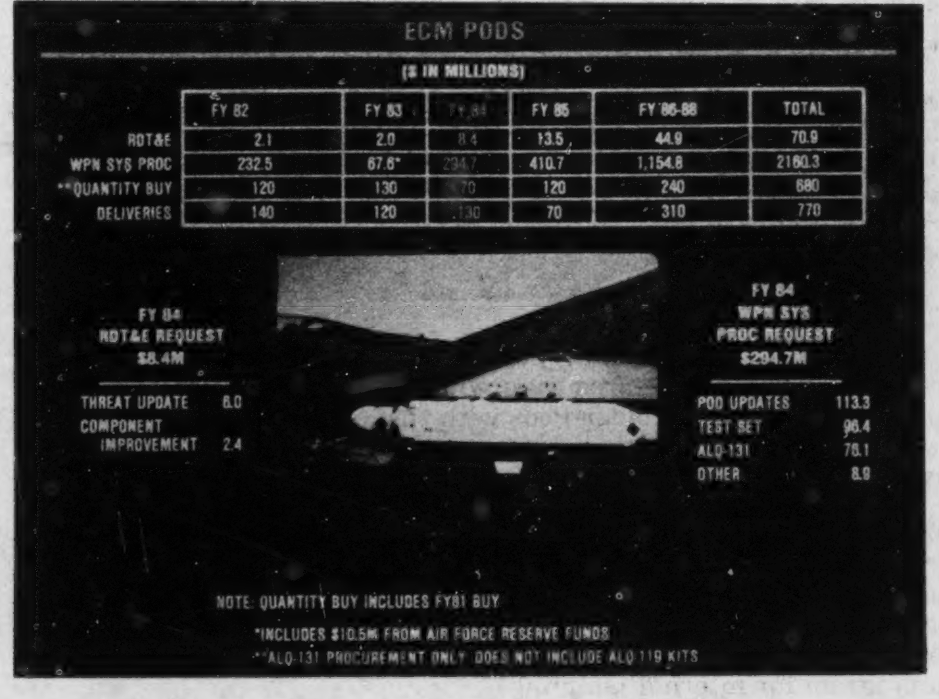
Senator **Goldwater**. Is it modern enough to handle what I understand to be the highly garbled transmission of the SAM-7? I think they use something over 10 frequencies and keep jumping around. You have to synchronize.

General **Skantze**. The ALQ–131 is software reprogramable and it will handle [deleted] in fact, we are putting [deleted] countermeasures technique into it to handle the [deleted].

Senator **Goldwater**. It would be a lot better inside the aircraft, in my book. That is a lot of drag there.

General **Gorton**. It does represent drag, sir. There is an aspect to it, though, you do have flexibility with it. You can take it off and switch it to other aircraft.

Senator **Goldwater**. How much does each one cost?



ECM PODS

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
RDT&E	2.1	2.0	8.4	13.5	44.9	70.9
WPN SYS PROC	232.5	67.6*	294.7	410.7	1,154.8	2160.3
**QUANTITY BUY	120	130	70	120	240	680
DELIVERIES	140	120	130	70	310	770

FY 84
RDT&E REQUEST
$8.4M

THREAT UPDATE	6.0
COMPONENT IMPROVEMENT	2.4

FY 84
WPN SYS
PROC REQUEST
$294.7M

POD UPDATES	113.3
TEST SET	96.4
ALQ-131	76.1
OTHER	8.9

NOTE: QUANTITY BUY INCLUDES FY81 BUY

*INCLUDES $10.5M FROM AIR FORCE RESERVE FUNDS

**ALQ-131 PROCUREMENT ONLY DOES NOT INCLUDE ALQ 119 KITS

General **Marshall**. The 131 Pods run about $1 million a copy.

Senator **Goldwater**. So, every time you want to get in a dog fight you dump a million dollars off your wing.

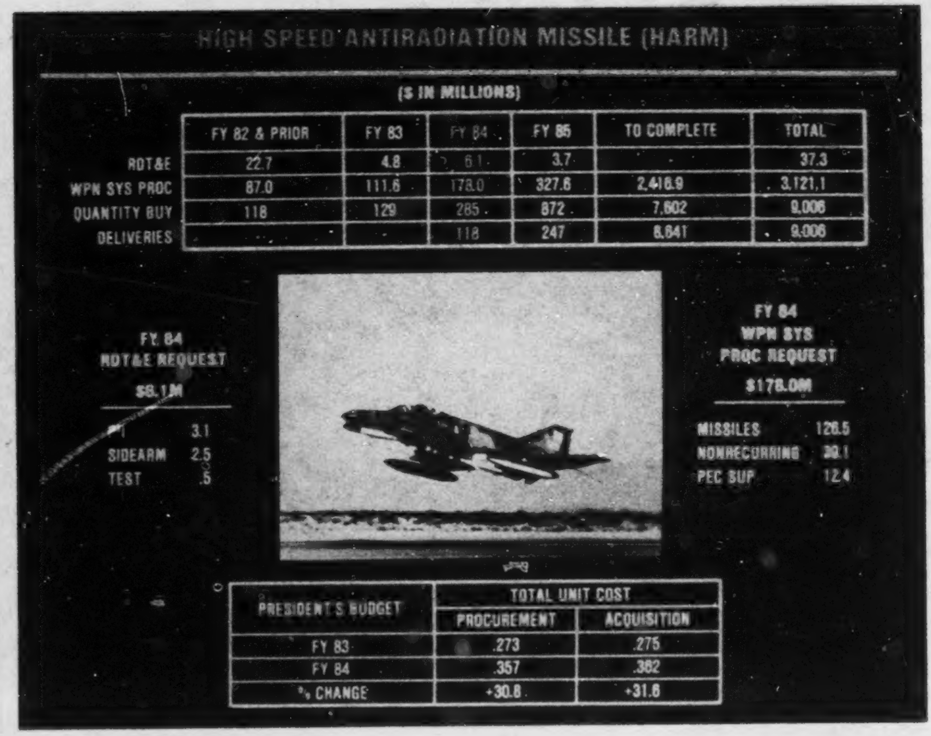
General **Gorton**. No, sir.

Senator **Goldwater**. I know somebody that would. [Laughter.]

General **Gorton**. If I got jumped I would dump everything, yes, sir. We are planning that the ALQ–131 Pod will not be jettisonable sir.

Senator **Goldwater**. You never know. Put them inside and bring them home.

General **Gorton**. The next program is for the Harm missile which is an advanced SAM emitter killer, it replaces our Shrike missile and is significant improvement over the Shrike missile. It is a joint program between the U.S. Navy and the U.S. Air Force.



HIGH SPEED ANTIRADIATION MISSILE (HARM)

($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
RDT&E	22.7	4.8	6.1	3.7	-	37.3
WPN SYS PROC	87.0	111.6	178.0	327.6	2,416.9	3,121.1
QUANTITY BUY	118	129	285	872	7,602	9,006
DELIVERIES	-	-	118	247	8,641	9,006

FY 84
RDT&E REQUEST
$6.1M

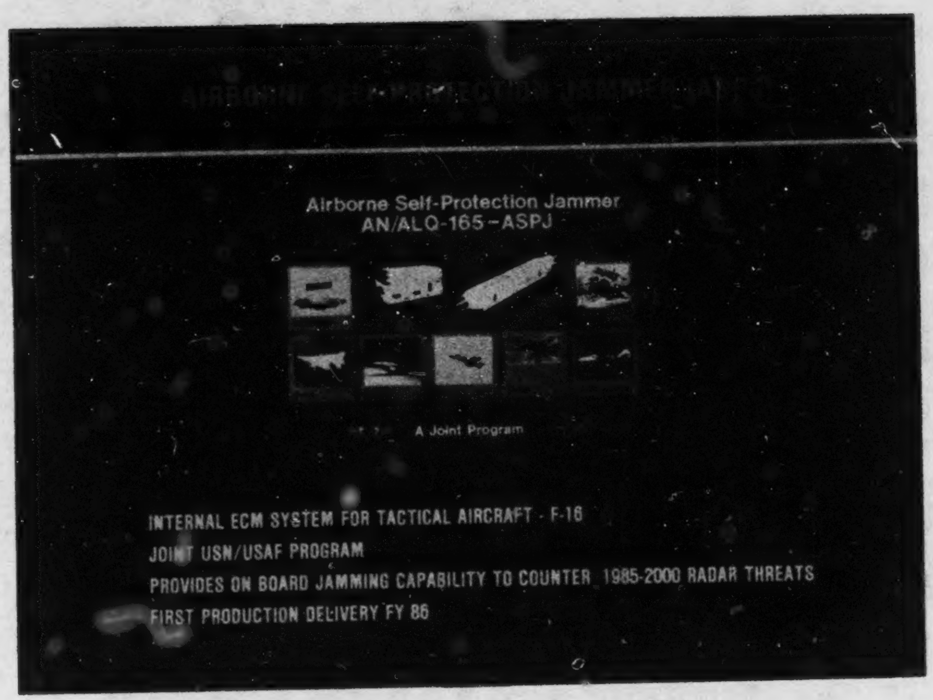
[illegible]	3.1
SIDEARM	2.5
TEST	.5

FY 84
WPN SYS
PROC REQUEST
$178.0M

MISSILES	126.5
NONRECURRING	39.1
PEC SUP	12.4

PRESIDENT'S BUDGET	TOTAL UNIT COST	
	PROCUREMENT	ACQUISITION
FY 83	.273	.275
FY 84	.357	.362
% CHANGE	+30.8	+31.6

Senator **Goldwater**. All right.



AIRBORNE SELF-PROTECTION JAMMER (ASPJ)

Airborne Self-Protection Jammer
AN/ALQ-165–ASPJ

A Joint Program

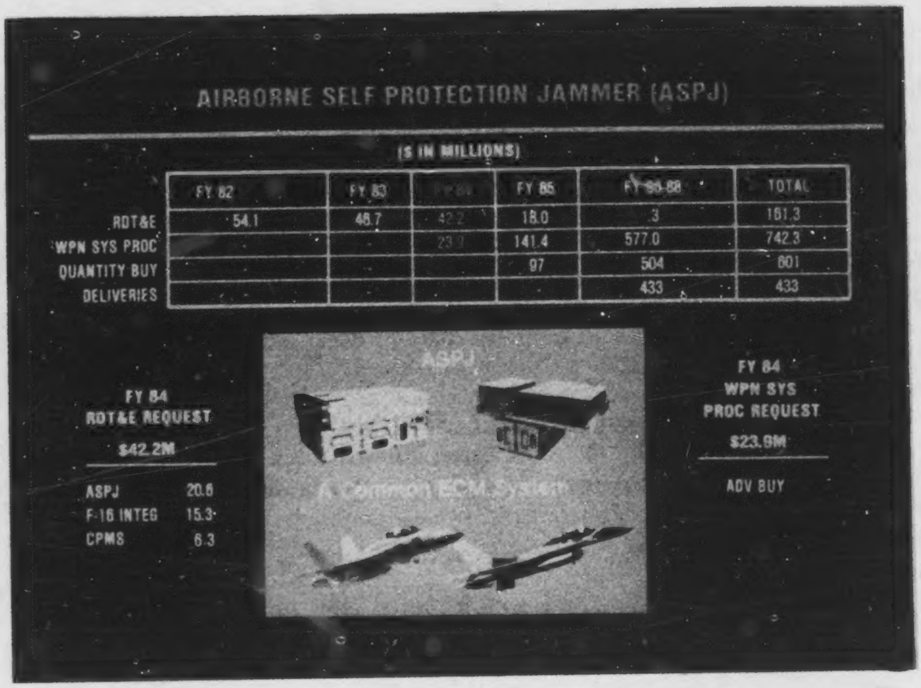
- INTERNAL ECM SYSTEM FOR TACTICAL AIRCRAFT - F-16
- JOINT USN/USAF PROGRAM
- PROVIDES ON BOARD JAMMING CAPABILITY TO COUNTER 1985-2000 RADAR THREATS
- FIRST PRODUCTION DELIVERY FY 86

General GORTON. This is the system we were talking about a moment ago, Mr. Chairman, this is the internal ECM capability, airborne self-protection jammer. It replaces the Pod as indicated in the center of the chart. It is internally mounted in the aircraft.

Senator GOLDWATER. Who makes that?

General SKANTZE. Westinghouse and ITT. It is a unique program in the sense that when they complete this development Westinghouse and ITT will split, they will both build components so you will have two sources.

Senator GOLDWATER. How is your testing coming out on this?



AIRBORNE SELF PROTECTION JAMMER (ASPJ)

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
RDT&E	54.1	46.7	42.2	18.0	.3	161.3
WPN SYS PROC			23.9	141.4	577.0	742.3
QUANTITY BUY				97	504	601
DELIVERIES					433	433

FY 84
RDT&E REQUEST
$42.2M

ASPJ	20.6
F-16 INTEG	15.3
CPMS	6.3

FY 84
WPN SYS
PROC REQUEST
$23.9M

ADV BUY

ASPJ
A Common ECM System

General **Marshall**. Sir, we are just now getting into the testing. The first deliveries of the ASPJ are not until the 1986 timeframe. So, we are into the testing now but we do not have an all-out system working yet.

Senator **Goldwater**. Is it coming up to what you want?

General **Marshall**. Yes, sir, I think so. It is just about on cost. It looks promising.

Senator **Goldwater**. And the performance?

General **Marshall**. Yes, sir. It will be as good or better than the ALQ–131 Pod. In fact, some of the technology that is going into ASPJ will be transferred into the 131 Pods.

Senator **Goldwater**. Then will you drop the 131 when you get this?

General **Marshall**. No, sir.

General **Skantze**. For the 16's, but the other aircraft will still require the Pods.

General **Marshall**. The first F–16 that will get it is No. 786. So, there will be a number of F–16's with internal ECH. We have a requirement worldwide for about 2,600 jamming Pods.

Senator **Goldwater**. I was going to ask you, is NATO going to use this?

General **Marshall**. Not ASPJ, they use Pods. They elected to stay with the Pods.

Senator **Goldwater**. Have any of them developed their own ECM of this type?

General **Gorton**. The only one that I know of is an Israeli modification, not a NATO. It is an Israeli modification to the U.S. system. I do not know of any of the NATO.

General **Skantze**. It is my impression that NATO was very, very slow to do anything in electronic warfare. It has only been in the last 5 or 6 years that they have done some things. I do not think the Pods are up to our standards. They have been looking at buying more of ours rather than developing their own.

Senator **Goldwater**. In the recent Lebanese war, did their aircraft use American ECM or was some of it Israeli?

General **Gorton**. Some of it was Israeli, sir. Some of it highly modified by the Israelis themselves. I am not sure whether they used any of our Pods.

General **Marshall**. I am not aware of any. They bought a Loral system called Rapport for their Mirages. They have taken that system and reengineered it themselves. I believe they also bought some of our early Pods, I think ALQ-119's.

Senator **Goldwater**. Do you have any information on how well those modifications worked because something was sure working. I read this morning that they are finally going to let us have all the information on the Lebanese war. I thought I had it all but I do not.

General **Skantze**. Well, we are hopeful this team that is going to go over will bring that information back.

Senator **Goldwater**. Have you had a team over there on this subject?

General **Skantze**. I do not believe so.

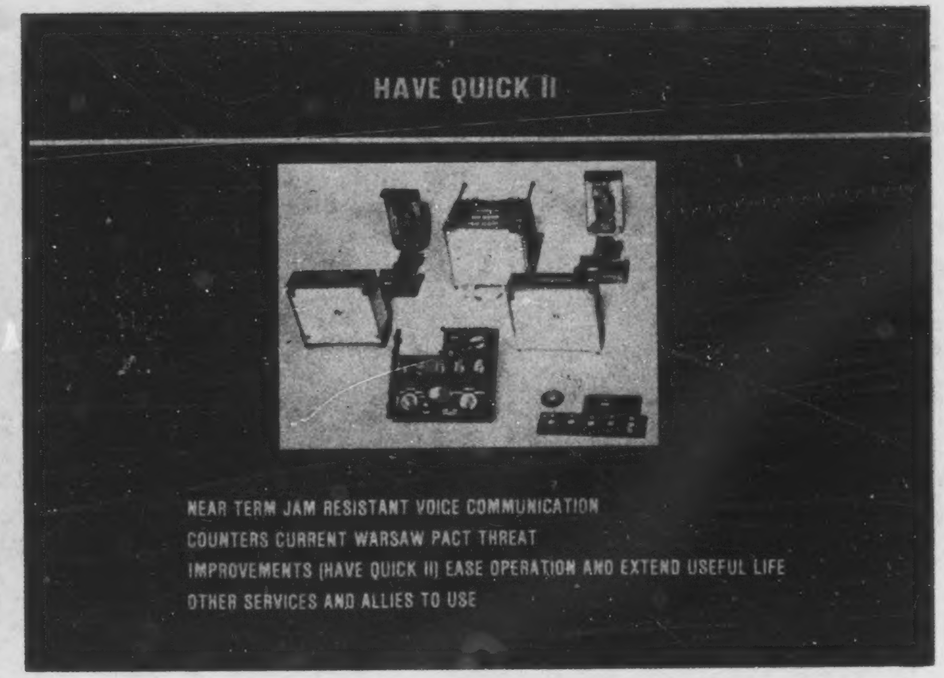
General **Baker**. They have not gone yet. The first group will go on April 7.

General **Skantze**. They were waiting for the agreement.

Senator **Goldwater**. I think their ECM was the outstanding part of that war in my book. I sure hope we will get full knowledge of their 90-degree efforts and their head-on efforts. They sure isolated that battlefield.

General **Skantze**. As I recall, at least from what I read, they used the 707 as the high altitude standoff jammer.

Senator **Goldwater**. All right, move on.



HAVE QUICK II

NEAR TERM JAM RESISTANT VOICE COMMUNICATION

COUNTERS CURRENT WARSAW PACT THREAT

IMPROVEMENTS (HAVE QUICK II) EASE OPERATION AND EXTEND USEFUL LIFE

OTHER SERVICES AND ALLIES TO USE

General GORTON. The next system, Mr. Chairman, is a modification to our standard UHF radio that is found throughout our tactical forces, it is called Have Quick. Have Quick II is an upgrade of that. Have Quick uses frequency hopping to overcome Soviet UHF jammers.

Senator GOLDWATER. Who is making this?

General SKANTZE. Magnavox makes the radio.

Senator GOLDWATER. Magnavox?

General SKANTZE. They put a slice into a UHF radio which allows them to do slow frequency hopping.

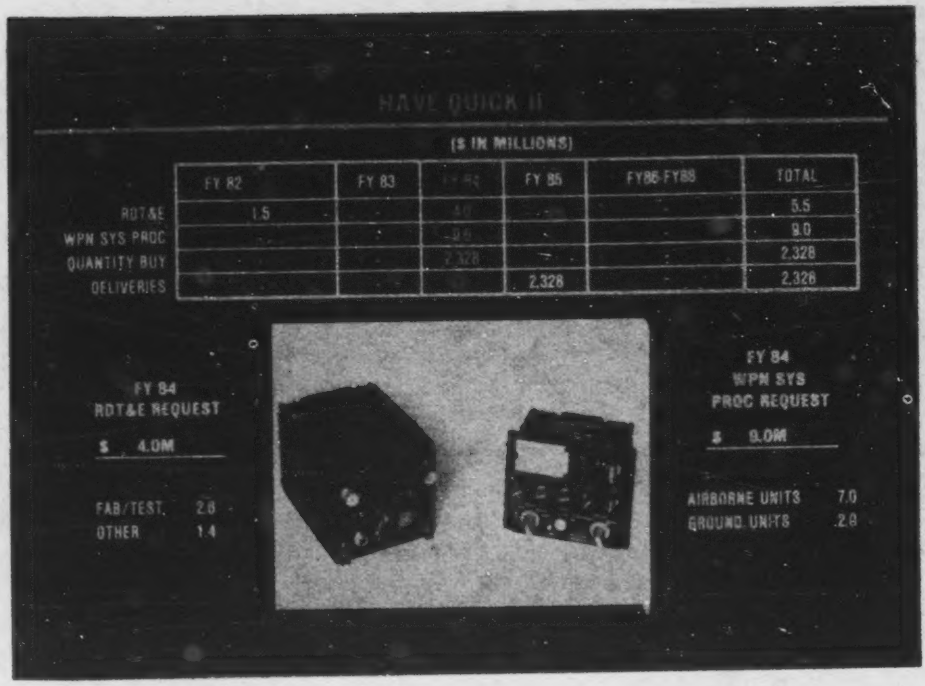
Senator GOLDWATER. This is much smaller.

General GORTON. It is a very minor modification of the radio. In fact, you have to make a small change in the control head and just drop the slice right into the standard radio. They take one part out.

Senator GOLDWATER. That is all solid state?

General GORTON. Yes, sir, as I understand it.

General MARSHALL. Yes, sir. There is one slice and a small modification kit, as he said, to modify the control so the pilot can switch to Have Quick.



HAVE QUICK II

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E	1.5	-	4.0	-	-	5.5
WPN SYS PROC		-	9.0	-	-	9.0
QUANTITY BUY		-	2,328	-	-	2,328
DELIVERIES		-		2,328	-	2,328

FY 84
RDT&E REQUEST
$ 4.0M

FAB/TEST.	2.6
OTHER	1.4

FY 84
WPN SYS
PROC REQUEST
$ 9.0M

AIRBORNE UNITS	7.0
GROUND UNITS	2.0

General GORTON. This modification averages about $4,000 an aircraft, and it allows us to communicate in a jamming environment. The jamming environment, as I am sure you are well aware, Mr. Chairman, is rather significant. This system works superbly. It is relatively low cost and easy to install.

Senator GOLDWATER. Is it a complete unit? I mean, is the power supply built into the unit?

General GORTON. Yes, sir. As I said, it is a modification to the basic radio, all you do is take one part out of the radio and put the new part in it.

Senator GOLDWATER. I got you. And this will handle all the UHF frequencies.

General GORTON. [Deleted.]

Senator GOLDWATER. You say the unit costs about $4,000?

General GORTON. That is an average, sir. It costs less in some cases and much more in others.

Senator GOLDWATER. And this is going to handle the threat through the 1980's?

General GORTON. It handles today's threat, but we are very much concerned about the jamming threat in the late 1980's.

Senator GOLDWATER. That is the only trouble with radios.

General GORTON. Yes, sir.

General SKANTZE. [Deleted.]

Then, the major effort to get to a substantial high antijam communication capability is the Have Clear program.

Senator GOLDWATER. Do you have these now in the F-15's and F-16's, or are they going in?

General **Skantze**. Yes. We bought about 6,000 of these kits and they are in F–15's and A–10's. We have flown them in Red Flag and used them in jamming environments.

Senator **Goldwater**. That is the rig.

General **Gorton**. This is for the minor upgrade of Have Quick II, sir, that will complete it.

Senator **Goldwater**. What does it weigh, 2 or 3 pounds?

General **Gorton**. It could not be much more than that, sir.

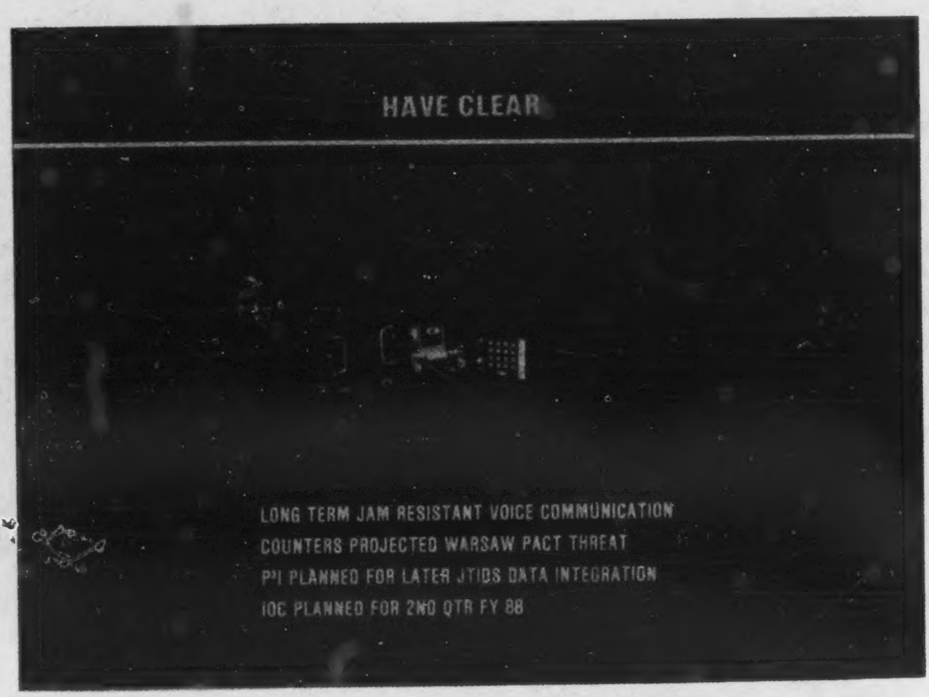
Senator **Goldwater**. I happen to be a radio nut. So, when I get on that subject it is hard to get me off. I will shut up. Go ahead.

General **Skantze**. This is the famous ARC 164 radio which we bought from Magnavox, just putting the slice in.

General **Gorton**. It works superbly, the aircrews are very enthusiastic about this model.

Senator **Goldwater**. All right.

General **Gorton**. You cannot even tell that it is working, it is transparent to the pilot. It just allows him to communicate, which is the basic purpose.



HAVE CLEAR

LONG TERM JAM RESISTANT VOICE COMMUNICATION
COUNTERS PROJECTED WARSAW PACT THREAT
P^3I PLANNED FOR LATER JTIDS DATA INTEGRATION
IOC PLANNED FOR 2ND QTR FY 88

The next program is a different modification to deal with the future jamming threat that we are predicting for the late 1980's, called the Have Clear program. It is a separate and different radio necessary to provide the capability to overcome the increased threat.

Senator **Goldwater**. What is the total program cost on this?

General **Marshall**. Sir, undetermined at this time, but if one were to put this system on, say, 8,000 or 9,000 radios in the tactical inventory and put it on all 32 platforms that could potentially take it, we would be talking about $3.5 billion.

Senator **Goldwater**. $3.5 million, or billion?

General **Marshall**. Billion.

Senator **Goldwater**. Billion.

General **Marshall**. But there are 32 different platforms—aircraft, ground platforms, and about 8,000 radios that will need high antijam voice.

Senator **Goldwater**. Then, at that price, you must be planning on putting them on every aircraft you have?

General **Marshall**. Well, definitely required for the aircraft that will operate close to the battle area, the F-16's, the A-10's, the FACS, and that is a very large number right there.

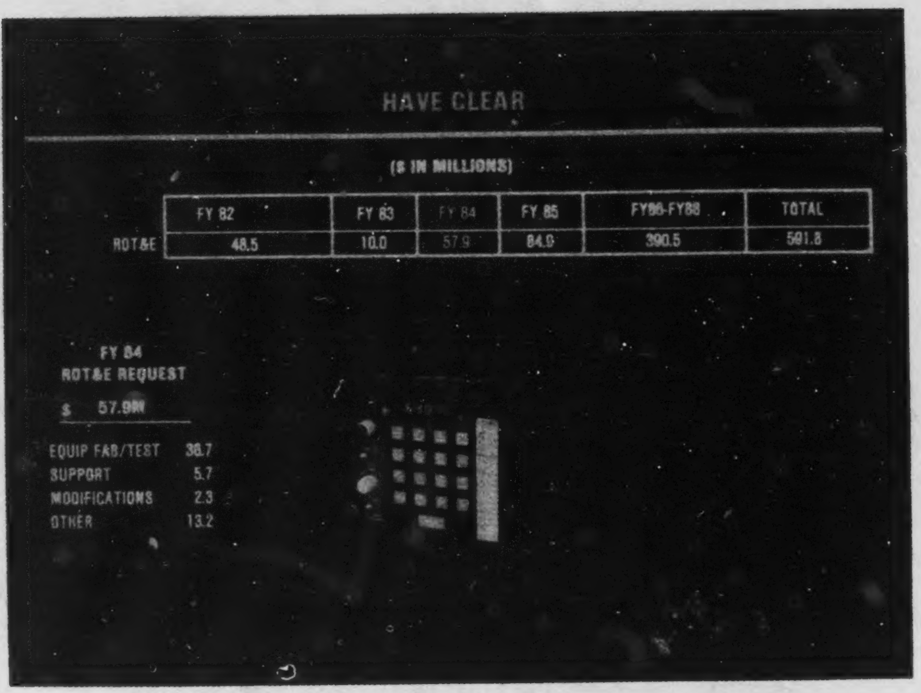
Senator **Goldwater**. For the record, if you could just send us a guess on how many aircraft we might be talking about.

PRICE OF PLATFORMS

The current requirement for HAVE CLEAR calls for installations into 6540 individual aircraft and ground platforms. Since a number of these platforms require multiple radio installations, a total of 7263 HAVE CLEAR terminals are required. Sparing brings the total terminals required to 8230.

Recently, however, the Tactical Air Command has reassessed the total platform requirements, potentially significantly reducing the total number of terminals initially required for the Tactical Air Forces. This reduced equipage plan is now under review at HQ USAF. The total number of aircraft and ground platforms under this reduced plan would be 4111, with a total terminal requirement of 4843. Sparing would bring the total terminals required to 5614.

General **Marshall**. All right, sir. Well, TAC is going through a detailed requirements breakdown by every aircraft right now. We will have that very soon.



HAVE CLEAR

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E	48.5	10.0	57.9	84.9	390.5	591.8

FY 84
RDT&E REQUEST
$ 57.9M

EQUIP FAB/TEST	36.7
SUPPORT	5.7
MODIFICATIONS	2.3
OTHER	13.2

Senator **Goldwater**. What unit cost are we talking about?

General **Skantze**. We do not have that defined yet. We are just getting into full-scale development. Last year this was the Seek-Talk program which we restructured and changed the configuration on. So, we are just getting back into full-scale development. We have just gone to the DSARC with the proposal but have not received a decision.

Senator **Goldwater**. Well, Have Quick is running around $4,000. Am I right, this might run $250,000, the unit cost?

General **Marshall**. Yes, sir.

General **Skantze**. Mr. Chairman, the thing that drives it is an antijam margin on the order of [deleted] that is Have Quick. In order to meet the threat that is clearly projected we have to get up to close to [deleted].

Senator **Goldwater**. You have to get that high?

General **Skantze**. That is correct.

Senator **Goldwater**. What kind of power are they using?

General **Gorton**. Very sophisticated management of power on their part, what we are estimating. One point, Mr. Chairman, is that this is the total radio replacement as opposed to Have Quick which is just a slice.

Senator **Goldwater**. Has our intelligence been able to get a hold of one of their pieces?

General **Skantze**. [Deleted.]

Senator **Goldwater**. Yes.

General **Skantze**. [Deleted.]

Senator **Goldwater**. [Deleted] db is an awful lot of noise.

General **SKANTZE**. Well, they have some very powerful airborne jammers as well as, we are looking for a new ground-jammer.

Senator **GOLDWATER**. Have there been any papers written on their radio equipment, aircraft radio equipment? I have naval radio equipment material that is very sophisticated, in fact, much higher sophistication than we have achieved.

If you have anything like that, I would like to see it.

General **GORTON**. We will submit that for the record.

[The information follows:]

PAPERS ON EQUIPMENT

Technical descriptions of Eurasian Communist Countries' aircraft radio equipments are contained in "Avionics Capabilities—ECC, Volume 2 Air Communications." This document is prepared by the USAF Foreign Technology Division for the Defense Intelligence Agency. [Deleted.]

General **MARSHALL**. I have not seen any but we will see what we can find. Sir, I would like to also say, I would like to offer Mr. Carl Smith a detailed briefing on this particular program. We have just completed an Air Force acquisition program review and a Defense acquisition program review. We owe you a report by April 15 on the results of that review. I would like to offer that to Mr. Smith.

Senator **GOLDWATER**. Did you not brief the staff on it?

General **MARSHALL**. We have not briefed anyone over here in detail on it.

Senator **GOLDWATER**. I would like you to brief the tactical warfare staff. I am just sitting here wondering, would it not be cheaper to go in and destroy the jammers, or are they airborne? Are we talking about Russian airborne jammers?

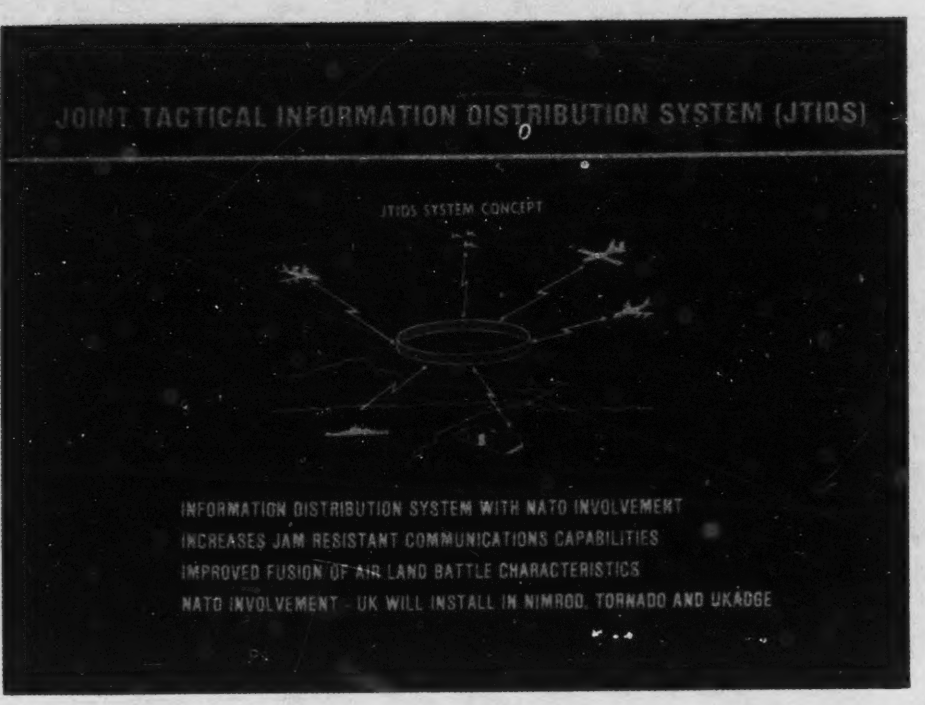
General **SKANTZE**. Airborne as well as ground.

General **MARSHALL**. We did a study of that, and to operate with a system like Have Quick against the future threat you have to get on the order of 99 percent of those jammers because some of them operate as high as [deleted]. So, it makes it very difficult to eliminate them.

Senator **GOLDWATER**. What capability increase does the Have Clear provide over Have Quick II? Is the difference fairly significant?

General **MARSHALL**. Yes, on the order of [deleted].

General **GORTON**. The next program we will be looking at, sir, is JTIDS. It is a data distribution system and a joint program.



JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM (JTIDS)

JTIDS SYSTEM CONCEPT

INFORMATION DISTRIBUTION SYSTEM WITH NATO INVOLVEMENT

INCREASES JAM RESISTANT COMMUNICATIONS CAPABILITIES

IMPROVED FUSION OF AIR LAND BATTLE CHARACTERISTICS

NATO INVOLVEMENT - UK WILL INSTALL IN NIMROD, TORNADO AND UKADGE

Senator GOLDWATER. You have one of those now in operation, is that right?

General SKANTZE. The class I terminal is going on the AWACS airplanes and also on ground sites over at NATO.

Senator GOLDWATER. But you have a ground site in operation.

General SKANTZE. Yes, sir.

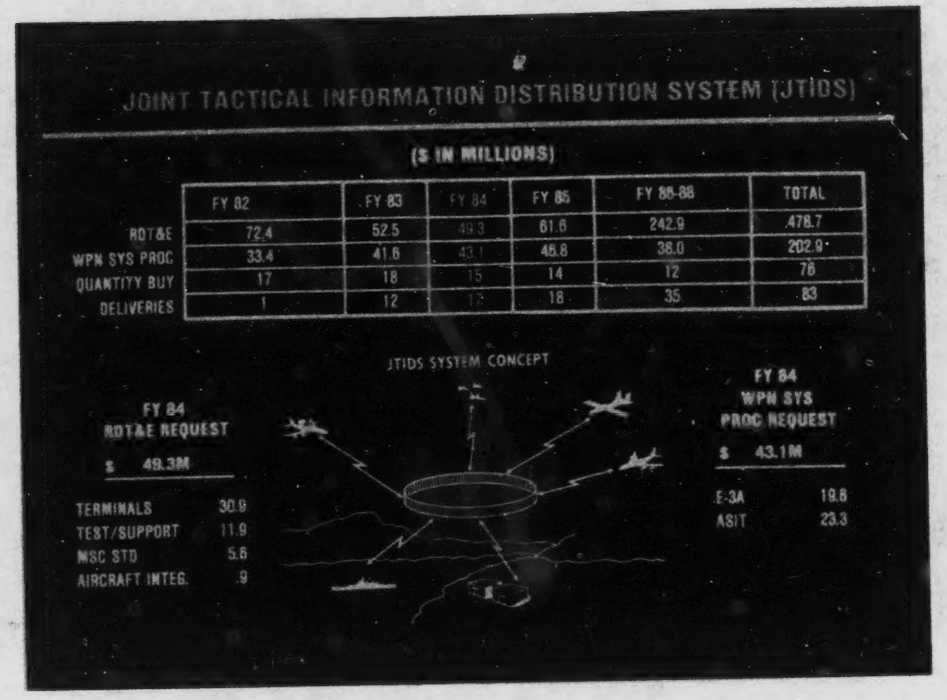
Senator GOLDWATER. I am going to see that come about June. Now, what spectrum of frequency would this operate on, all of them?

General SKANTZE. This is on L-band.

Senator GOLDWATER. Oh, L-band.

General SKANTZE. Yes, about 150 megahertz on L-band.

Senator GOLDWATER. And what are we talking about in unit cost, do you have that yet?



JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM (JTIDS)

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
RDT&E	72.4	52.5	49.3	61.6	242.9	478.7
WPN SYS PROC	33.4	41.6	43.1	46.8	38.0	202.9
QUANTITY BUY	17	18	15	14	12	76
DELIVERIES	1	12	17	18	35	83

JTIDS SYSTEM CONCEPT

FY 84
RDT&E REQUEST
$ 49.3M

TERMINALS	30.9
TEST/SUPPORT	11.9
MSC STD	5.6
AIRCRAFT INTEG.	.9

FY 84
WPN SYS
PROC REQUEST
$ 43.1M

E-3A	19.8
ASIT	23.3

General SKANTZE. The ground terminal, which is a fairly large size terminal—and we are only buying about 25—runs about $1.7 million each. Now, this is the tie-in to the ground-control structure, the NADGE structure in NATO. The capability is about 60 kilobit per second. So, you have a constant data flow going up and down to the aircraft.

Senator GOLDWATER. Any time you want to ask some questions, go ahead.

Senator WILSON. Thank you.

Senator GOLDWATER. Before we leave that—you do not have to go back to the slide—it does have voice capability. Are we talking voice?

General MARSHALL. It has a limited voice capability. It is a digital data stream and you can put voice on it at the expense of some of the data flow.

Senator GOLDWATER. All right, let us say you have a piece of information you want to send to an AWACS, how do you put that into the form that it will be transmitted if it is not voice? Would it be received in a computer, for example, a readout in the aircraft?

General SKANTZE. Yes, because the data is read out in a time sequence and all of the stations on the circuit are timed to transmit at specific finite times.

Senator GOLDWATER. I know, but I am interested, say I am in the aircraft here on the ground and you want to get some tactical information. What am I going to look at?

General SKANTZE. You are in the fighter and I am going to tell you on voice that I am to pair you with somebody. Then I start to send the data and it comes up on your display. It gives you where to steer, where he is, what your vector is.

Senator **Goldwater**. You could send more detailed information to an AWACS if you had to?

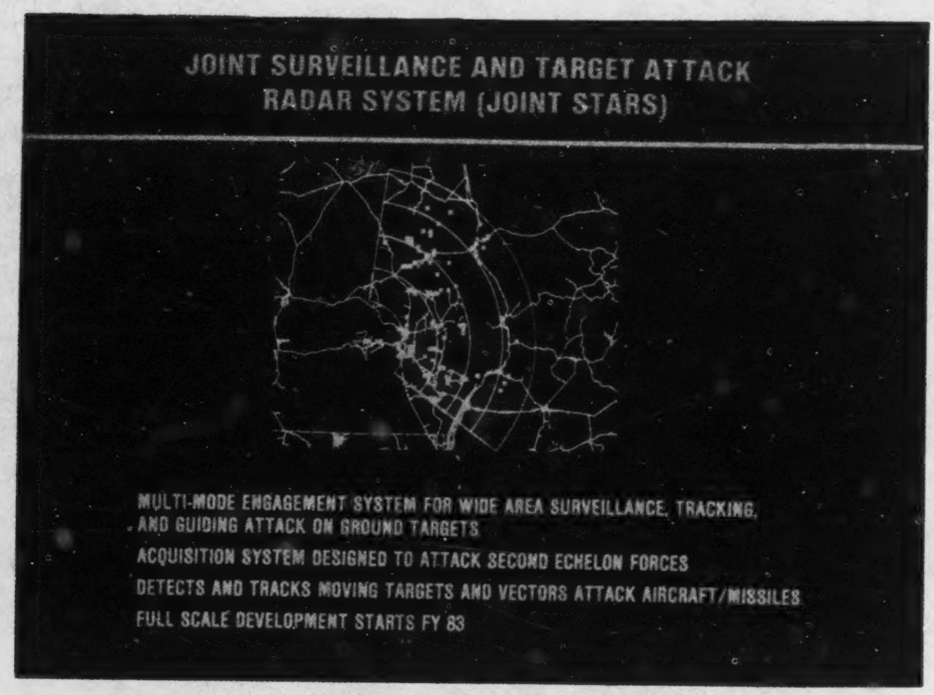
General **Skantze**. Yes, sir, or an AWACS to a fighter. Now, the fighter terminal is in development now. We are not that far down the road on that.

Senator **Goldwater**. How far are you away from having it almost forcewise, say for the whole Tactical Air Force?

General **Skantze**. Oh, we are starting out with a limited program to put them on F-15's, and then practice using them. Learn more about how we want to use it.

Senator **Goldwater**. Are there any at Langley?

General **Skantze**. Not yet, sir.



JOINT SURVEILLANCE AND TARGET ATTACK
RADAR SYSTEM (JOINT STARS)

MULTI-MODE ENGAGEMENT SYSTEM FOR WIDE AREA SURVEILLANCE, TRACKING, AND GUIDING ATTACK ON GROUND TARGETS

ACQUISITION SYSTEM DESIGNED TO ATTACK SECOND ECHELON FORCES

DETECTS AND TRACKS MOVING TARGETS AND VECTORS ATTACK AIRCRAFT/MISSILES

FULL SCALE DEVELOPMENT STARTS FY 83

General **Gorton**. Sir, this next program is a joint program, Joint Stars, an Air Force led joint program with the Army—advanced technologies that you may be familiar with—was the Pave Mover radar. This system is designed to jointly provide information to the theater commander and the battle commanders as to the location of ground targets. It has an MTI capability, a moving target indicator capability. It is the primary system that would be used in joint attack of the second echelon to locate Soviet ground force movement. It is to the ground battle what the AWACS is to the air battle.

Senator **Goldwater**. Now, this has to be airborne?

General **Gorton**. Yes, sir, it is programed to be airborne. There are a number of systems that we are looking at. The Army is looking at an OV-10 as the primary platform for the radar; we are looking at a C-18.

Senator GOLDWATER. General, what aircraft does the Air Force plan to use the Joint Stars on?

General SKANTZE. We plan to use it on a C-18 which is basically a B-707.

Senator GOLDWATER. Oh, yes.

General SKANTZE. We buy cheap used airplanes but good airplanes. It is one of our Boeing 707-320's which we now call C-18's. This is a joint program. The Army has a more near-term requirement for standoff battlefield surveillance. So, we are going to have a common radar. The Army will be the first user of that common radar on OV-1 to do the battlefield surveillance role.

Our requirement includes multimode capability (MTI, fixed target imagery, and weapons guidance) is a little farther downstream. So, we would plan to put one in a C-18 or in a couple of C-18's with some data-handling capability because we are not just talking about the central region of Europe ourselves. We might be going to Southwest Asia and we need a fairly autonomous capability.

This is an outgrowth of the Pave Mover radar program which we had. So, the Army has a more near-term requirement. We are a little farther downstream.

We may also wind up making it compatible with TR-1 for carriage.

Senator GOLDWATER. That was what I was going to ask you. Isn't the OSD determined to put this on the TR-1?

General SKANTZE. Yes. We have had a dialog giving them our rationale for putting it on the C-18. I think they would also like to see it compatible with the TR-1.

Senator GOLDWATER. Is there anything wrong with putting it on the TR-1?

General SKANTZE. Well, the technical challenge is going to be tougher. Weight may be a problem. We want to be sure we do not get into totally redesigning a Pave Mover radar.

Senator GOLDWATER. This has to go in the nose.

General SKANTZE. Actually, in a faired-in bellypod.

Senator GOLDWATER. Will it be the same bulbous nose that we now see on the 707?

General SKANTZE. No, it will probably be longer.

Senator GOLDWATER. Longer. Now, you have an acquisition system designed to attack second echelon forces. My first feeling is that any ground war, that is going to be the important part of the whole battle.

How do you design something to differentiate between the main attack force and second echelon, and third echelon?

General GORTON. I think what will happen, what must happen is that Joint Stars, although a prime vehicle in locating moving things behind the front, will be used in conjunction with other intelligence information and fused together at the theater commander's or the battle commander's headquarters to make specifically that determination.

The Joint Stars will be the largest input to that because it is the only system that we can actually see them move on a real-time basis. We hope that with that information we will be able to differentiate in particular where the main thrust will be coming.

Senator **Goldwater**. I hate to keep bugging you on this, but the more altitude you have the better you can operate. It makes sense to me, then, to use the TR–1 because your 18 is going to 30,000, 35,000 maybe. If you get something up there to 80,000 you come up a lot further and safer.

General **Skantze**. But you still have a radar resolution problem with range. You want to differentiate.

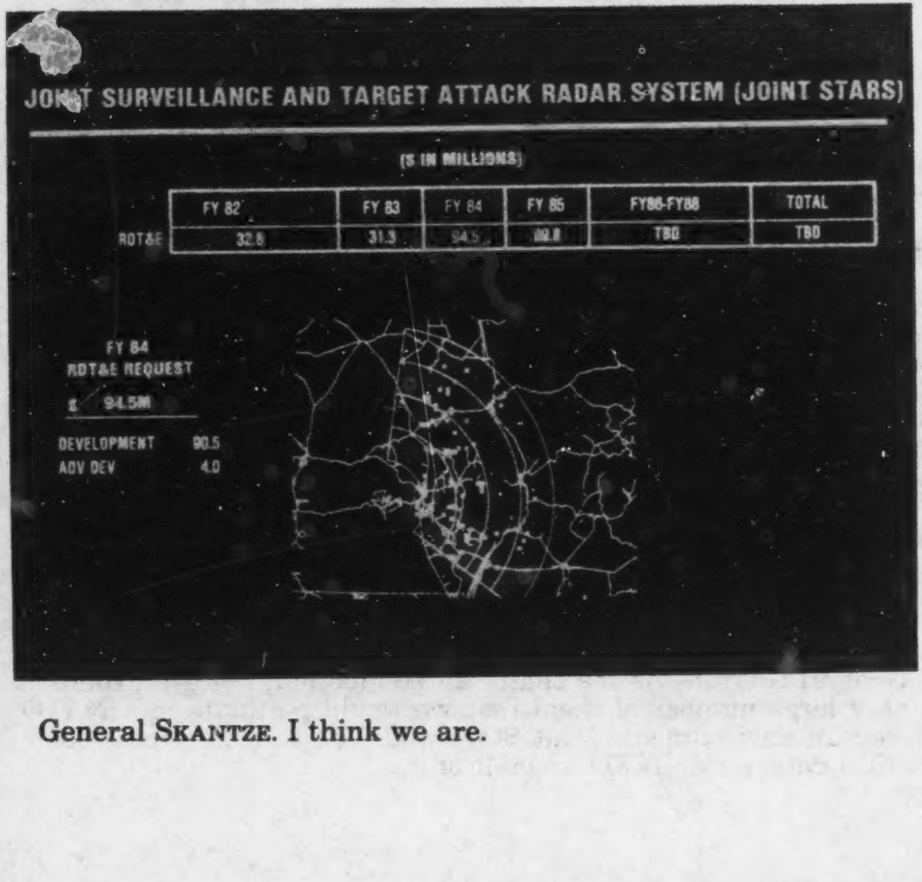
Senator **Goldwater**. But General, isn't mass going to be the feeder of that resolution problem? If you are talking about second echelon you are talking about a substantial match movement.

General **Gorton**. Certainly, we would expect the enemy as he begins to tactically deploy mass, to tend to stay spread apart as best he can up until the point he gets to tactical deployment, then he will mass and attack at the point of choice. He is very concerned about nuclear weapons. He is also very concerned about air attacks. So, he tends to try and keep himself diffused until the point where he masses for attack.

Senator **Goldwater**. It cannot be done with that size force. I am very interested, I hope you will keep us posted on any progress you make on the TR–1.

General **Gorton**. Yes, sir.

Senator **Goldwater**. I have only one more question. Are you requesting full-scale development funding for Joint Stars for 1984?



JOINT SURVEILLANCE AND TARGET ATTACK RADAR SYSTEM (JOINT STARS)

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E	32.8	31.3	94.5	[illegible]	TBD	TBD

FY 84
RDT&E REQUEST
$ 94.5M

DEVELOPMENT	90.5
ADV DEV	4.0

General **Skantze**. I think we are.

General **Marshall**. Yes, sir. We want to get started in 1984 on FSD.

Senator **Goldwater**. What is the program cost estimate?

General **Marshall**. Sir, we do not have that yet for the simple reason that we have not settled down on the platform; we have not settled down on radar design, nor have we settled down on numbers on aircraft.

Senator **Goldwater**. Who is building this?

General **Marshall**. Well, for the original Pave Mover system which we flew, which General Skantze referred to, and we flew on F–111's, Hughes and Grumman were the prime contractors. Grumman with Norden were one team and Hughes was the other contractor.

Senator **Goldwater**. Senator, do you have any questions?

Senator **Wilson**. Yes, thank you, Mr. Chairman.

On this Joint Stars, what is that able to pick up? I assume not just armor but you could actually pick up sizable troop movements as well?

General **Skantze**. You can either pick up fixed targets or moving targets. They will tend to be blips out there. You will find those little moving blips. But obviously, with some understanding of the territory, you know, the movement is clearly enemy forces. You know the route that they are coming.

But the radar at long range is not going to be able to distinguish the difference between the truck and tank at that point.

Senator **Wilson**. So, what this really does, General, it allows you supplementary intelligence to make sense of what is happening.

General **Skantze**. Yes.

Senator **Wilson**. Now, your platform is how many thousand feet above the battlefield?

General **Skantze**. It could be 30,000 feet or higher than that if we used the TR–1 aircraft. For example, at 30,000 feet your radar horizon is about 250 miles. That is about how far you can see at 30,000 feet.

Senator **Wilson**. And then, how do you relate the intelligence to the ground forces?

General **Skantze**. If you had a big enough airplane like the C–18, you could process some of that right on board. Other than that, you could have a data link that goes directly to the ground and reads out the information to the commander on the ground. Who, with other intelligence, can interpret what it is and decide what forces he wants to use to attack it, aircraft carrying weapons or missiles; and then use the system to guide those weapon carriers to the target.

Senator **Wilson**. You say from studying the tactics of the Soviets, they tend to stay apart until they are really at the point of tactical deployment?

General **Skantze**. Subject to the terrain that they have to move over. In some cases, you are constrained to coming through valleys and hills and you cannot really spread out.

General **Gorton**. As the chairman pointed out, however, there is a very large number of them that we would postulate in a NATO European environment. Joint Stars would be able to give us some tactical data, a significant amount of it.

Senator WILSON. Well, let me ask a basic question. What is your weather capability with respect to this?

General SKANTZE. This is an all-weather system.

Senator WILSON. So, you can have a situation where you have total cloud cover when they begin their movement?

Senator GOLDWATER. I have to go work on another piece of legislation. Thank you, gentleman. Please, keep us posted.

General SKANTZE. Yes, sir.

Yes, it will work in all weather. I think if it is really bad weather we do not move very well in the mud and I do not think he does, either. But basically it is an all-weather system.

Senator WILSON. We are probably dealing with a far more limited theater of operations than the scope of this system can encompass. But I am thinking back of the Battle of the Bulge. I assume if this had been available it would have been a tip-off that we just did not have.

General SKANTZE. Yes. If you recall, the Germans deliberately used the weather. We had a clear air-mass fighter force and bomber force and we could not use them. So that they moved under the weather and we had no way of using airpower to take them on. With this system you certainly could.

General GORTON. Another aspect to the Joint Stars system is that it is an engagement system as well as a tracking system. You can tie a weapon to Joint Stars and guide the weapon into the general area. So, it is not only an intelligence-gathering system but also an engagement system.

Senator WILSON. In that connection, General, how nearly can you pinpoint with that weapon what kind of target?

General GORTON. We are in the process of attempting to look at various guidance systems and weapons for the Joint Stars. That has not been defined yet. Its principal use is as an intelligence-gathering system and tracking system.

General SKANTZE. You can either guide an airplane which is carrying weapons to where the target is, or you can have Smart standoff missiles and guide those.

For example, as the precursor to this kind of joint development we used the Pave Mover radars on the two F-111 aircraft flying at White Sands Missile Range in New Mexico. We had the F-111 aloft and fired an Army missile from the ground which had some Smart munition in the front and actually with that radar guided that missile in the terminal phase.

Senator WILSON. So, your capability is very broad.

General SKANTZE. Yes.

Senator WILSON. On that White Sands experience, the weapons you employed there require what kind of target?

General SKANTZE. It carried five of these small tactical submunitions and each one went after a tank and hit a tank. We had an array of old tanks sitting out there.

Senator WILSON. What was the total range involved?

General SKANTZE. Probably at White Sands no more than [deleted] miles because we are constrained by the length of the range; but sufficient to demonstrate that this process would work.

Senator WILSON. Senator Kennedy, we are talking about a system that is used for surveillance, tracking and engagement. The question relates to the employment of the system for engagement of ground targets with air-to-ground missiles or air-to-ground weapons. This has a total range from an altitude, say, of 30,000 feet. Did you say 250 miles?

General **Skantze**. You can see 250 miles but you would probably be looking in the [deleted] mile range.

Senator **Wilson**. Principally, the value it has is for a second-echelon ground battle. We are talking about the fact that in Bastogne and the Battle of the Bulge the availability of this kind of radar system would have permitted an attack against the Germans which was impossible, given the cloud cover which prevented any engagement by then existing aircraft.

Senator **Kennedy**. Excuse me, I apologize for being late. Would you comment, General, on how effective this weapon system is against tanks?

General **Skantze**. Yes. It has currently been fashioned into a joint program. The Air Force has the leadership. The Army is associated with us and we are trying to define and develop a common radar. We have demonstrated prototype radars before but the Army has a certain requirement and we have one. The Department is attempting to put those together so we will have a common radar which will satisfy each service.

The Army will put their radar on small, lower flying airplanes called OV-1 to look in the near distance beyond the edge of the battlefield. We will put ours on higher flying airplanes to look well beyond the near edge of the battlefield.

Prior to this, we each had a different requirement, we each had a different radar.

Senator **Kennedy**. What does your flow chart line look like in terms of when you will meet these common requirements?

General **Skantze**. We are talking about meeting an Army requirement to be ready to fly in [deleted.] We are probably about 2 years later [deleted] for the Air Force.

Senator **Wilson**. And your platform for this is what you call C-18?

Senator **Skantze**. C-18.

Senator **Wilson**. And the Boeing 707?

General **Skantze**. We will probably also make it compatible to the TR-1.

Senator **Kennedy**. If the chairman would yield for just a minute.

Senator **Wilson**. Sure.

Senator **Kennedy**. In terms of our evaluation, how should we judge whether this is a more effective way to kill tanks than other antitank weapons?

General **Skantze**. Let me make a comment that might shed a little bit of light on it. Basically in the last decade we have developed technology which provides for very good sensor capability with radars, infrared sensors, the ability to discriminate effectively and see things moving at considerable ranges.

We have also developed Smart weapons to go along with that. The tactical battlefield, if you will, is a problem where you not only want to be able to handle any initial assault but in the real sense you want to be able to get behind that initial assault and take out what we call the second echelon armor. That has always been a classic problem.

You know, the Army fires shells across the line and they fire rockets. We can send 200 airplanes each with a couple of weapons looking for that armor and trying to destroy it.

With the advent of the kinds of radars we now have which can do this kind of broad looking, if you will, plus Smart weapon applications, there is an opportunity to be able to handle that second echelon in a much more effective way.

If you can indeed develop that capability and demonstrate it, you know, then you are in a position to trade off in a more efficient way against other massive ways to do the same thing. So, in a sense this program in its embryo stage is designed to see if we can more efficiently take on that second echelon problem.

Senator **KENNEDY**. I do not want to delay the process of the hearings. It does seem to me that this system may offer a significant breakthrough.

I think it is well worth taking a hard look at.

I thank the chairman.

Senator **WILSON**. Would you mind going back to that slide? I was interested in your fiscal year 1984. You are looking at $94.5 million and $89.8 million in the next year.

General **MARSHALL**. Sir, that is just the Air Force's contribution. The Army also has, for example, in 1984 $69.5 million for development also. So, the two of us together have a total of $164 million programs for 1984 for research and development.

Senator **WILSON**. General Marshall, does that mean primarily developing the engagement capability, deciding what weapons you are going to have?

General **MARSHALL**. The first thing is the development of the radar itself, that is the longest item. Then you have a ground station to go with it, and then you have the integration job onto the aircraft platform that it will be flown on. You start all of that in 1984.

Senator **WILSON**. To pursue Senator Kennedy's line of questions a little bit, what other capability do you now possess for targeting moving armor?

General **GORTON**. There is no capability for targeting moving armor at this juncture. The Joint Stars program is the one that would give us that. There are a number of systems that we are looking at, developing weapons systems, basically, which would be employed. Joint Stars is the only system that would provide us the ability to target moving things.

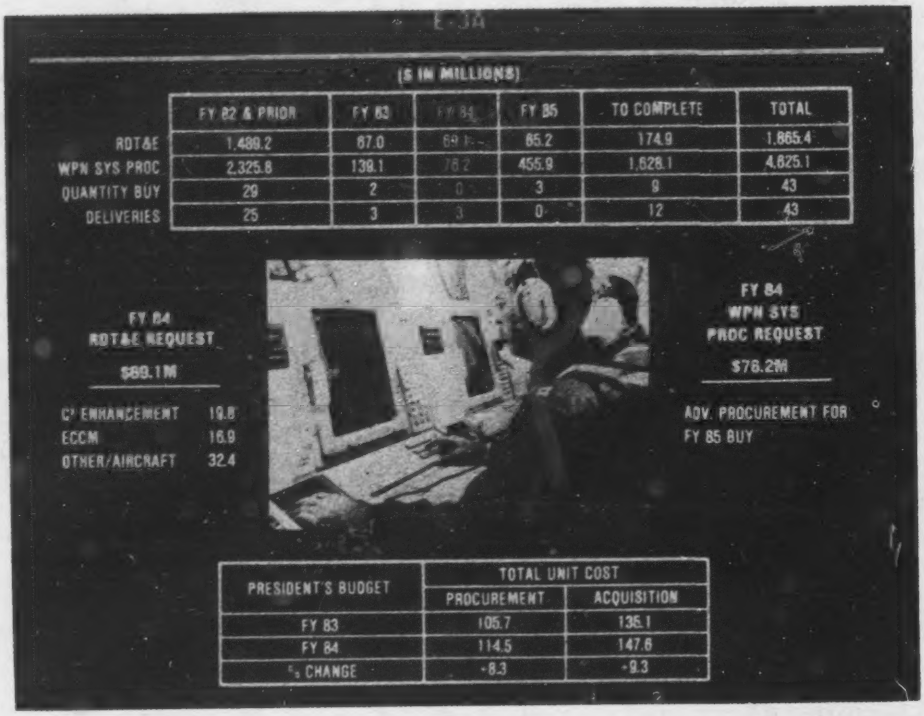
General **SKANTZE**. You do not have this sort of high level, high flying, target acquisition capability. It is embodied now in the Pave Mover radar that we developed over the last couple of years and have been flying in the F-111 airplane. But that is the first time we put that kind of capability together.

If you had to go look for armor tomorrow, you are going to do sort of armed reconnaissance over the front line, looking for it.

Senator **WILSON**. So, this is what we are going to have, realistically, you are going to have the technology in hand by [deleted] and we will have it mounted and flying by [deleted]. Is that your target?

General **Skantze**. Yes, sir. The Army would like to have their capability by [deleted]. I think the Air Force is about a year or two later.

General **Gorton**. Sir, the next system that we will review is the E-3A, a system well known. It provides the major airborne radar portion of our air defense net.



E-3A

($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
RDT&E	1,489.2	67.0	69.1	85.2	174.9	1,865.4
WPN SYS PROC	2,325.8	139.1	76.2	455.9	1,628.1	4,625.1
QUANTITY BUY	29	2	0	3	9	43
DELIVERIES	25	3	3	0	12	43

FY 84
RDT&E REQUEST

$69.1M

C^3 ENHANCEMENT	19.8
ECCM	16.9
OTHER/AIRCRAFT	32.4

FY 84
WPN SYS
PROC REQUEST

$76.2M

ADV. PROCUREMENT FOR
FY 85 BUY

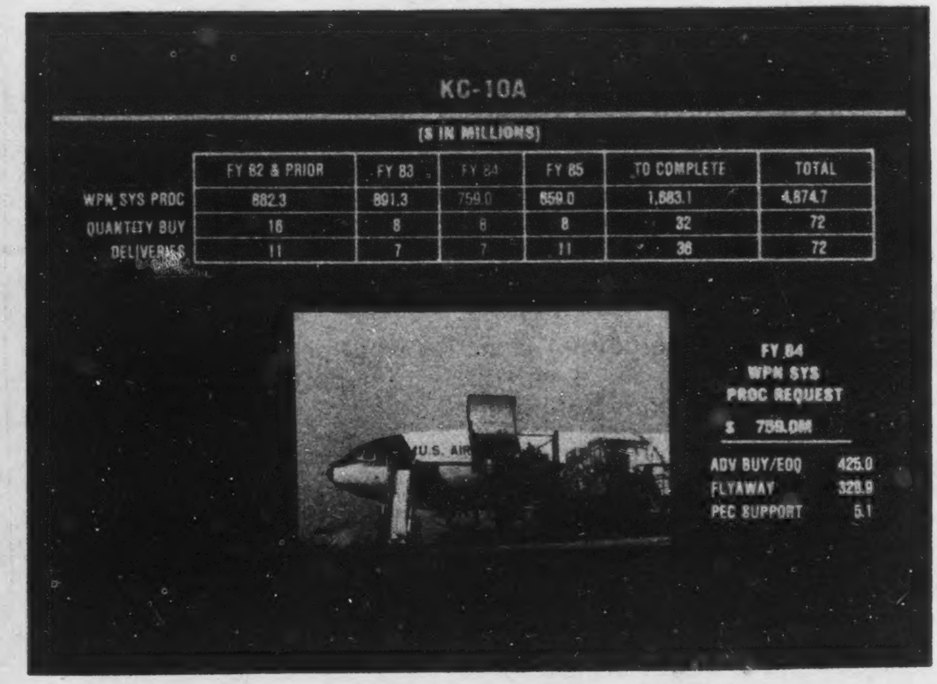
PRESIDENT'S BUDGET	TOTAL UNIT COST	
	PROCUREMENT	ACQUISITION
FY 83	105.7	135.1
FY 84	114.5	147.6
% CHANGE	+8.3	+9.3

We are requesting in the President's budget in the year of 1984 the procurement that will eventually lead to the addition of 12 E-3A's, principally for the purpose of Strategic Air Defense. This will bring our total force of E-3A's to 46.

Senator **Wilson**. Where is it presently deployed?

General **Skantze**. The main operating base is Tinker Air Force Base in Oklahoma, Oklahoma City. They have permanent deployments in Iceland. There are two airplanes there. They have permanent deployment in Kadena, Okinawa, and we have some deployed in Saudi Arabia.

General **Gorton**. The next program we will look at is the KC-10. This aircraft is a modification of the DC-10 that carries both cargo and a refueling capability for fighters or, as shown in this depiction, the E-4.



KC-10A

($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
WPN SYS PROC	882.3	891.3	759.0	659.0	1,683.1	4,874.7
QUANTITY BUY	16	8	8	8	32	72
DELIVERIES	11	7	7	11	36	72

FY 84
WPN SYS
PROC REQUEST
$ 759.0M

ADV BUY/EOQ	425.0
FLYAWAY	328.9
PEC SUPPORT	5.1

Senator **Wilson**. What is your deployment on the KC–10?

General **Skantze**. They are assigned to the Strategic Air Command. The first squadron is at Barksdale, Air Force Base, La. There is one at March Air Force Base and I think there is going to be a third one at Seymore Johnson, Air Force Base, N.C. They deploy worldwide.

Senator **Levin**. Before you move that slide, did the President not say that he was proposing 44 of those last year when he talked about enhanced airlift?

General **Skantze**. Yes, and we signed the contract in December.

Senator **Levin**. I am just looking at that figure of 72.

General **Skantze**. That is 44, that includes the 44.

Senator **Levin**. The 44 was not supposed to be the total. There are 44 additional, is that it?

General **Marshall**. Originally, we had 60 in our long-range contractual plans. We bought the first 16 on annual procurements. Last year, we asked for permission to buy 44 on a multiyear basis, in other words, there is one contract for those 44. That is the contract we are referring to.

Senator **Levin**. So, that total quantity of 72 has not changed over the last couple of years.

General **Marshall**. Yes, sir. We have added 12 in 1988, I believe it is, to bring the total up to 72.

Senator **Levin**. And the 44 had to do with a multiyear contract, not with how many we were going to buy altogether, or how many additional we were going to buy.

General **Marshall**. That is correct.

Senator **Levin**. It did not relate to either one of those figures.

General **Marshall**. That is correct.

General **Gorton**. The next program we will review is the TR-1. As we previously discussed, this is a reconnaissance platform. It is used as a PLSS, precision location strike system platform as well as a reconnaissance ASAR's platform.

Senator **Wilson**. What is the cost of this per copy?

General **Marshall**. It is $16.2 million per copy.

General **Skantze**. That is the airframe unit cost, just the airplane.

General **Marshall**. That does not include spares, support equipment.

Senator **Wilson**. Including the spares what does it come to?

General **Marshall**. Sir, I will have to supply an exact number for the record. It is about $20 million.

[The information follows:]

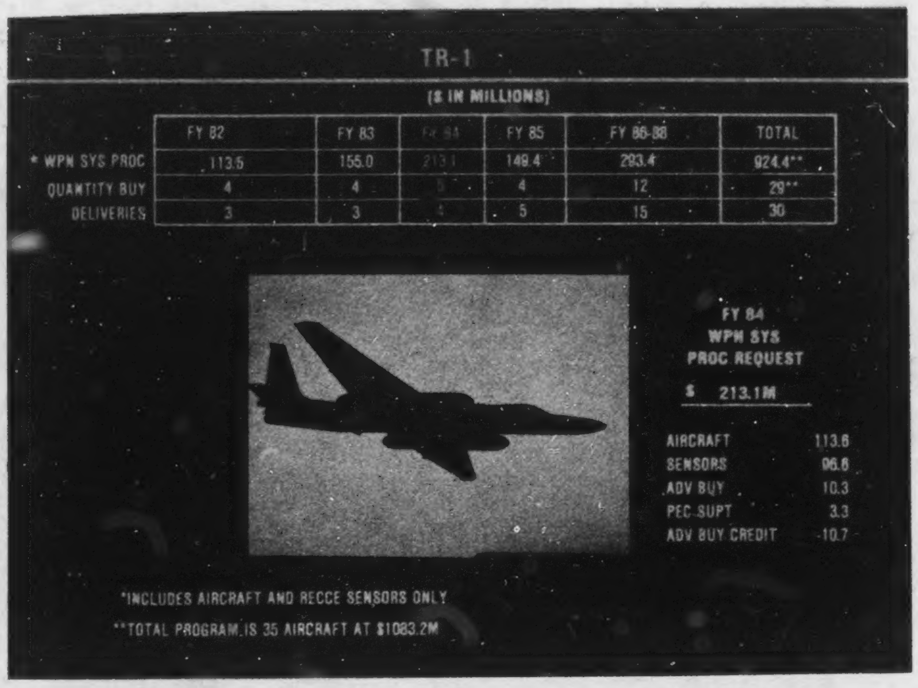
TR-1 Cost

In February 1983, the Air Force executed a contract for five TR-1/U-2R airframes at a unit target price of $16.2M. Including non-recurring and peculiar support, we estimate that the fiscal year 1983 unit air vehicle cost less airborne sensors will average $21.2M, plus an additional $1.6M each for aircraft initial spares.

In comparison, we estimate that the fiscal year 1984 unit air vehicle cost with all support except airborne sensors will average $23.38M, plus an additional $1.6M each for aircraft initial spares. At the unit flyaway level, this amounts to a 7.1 percent then year growth over fiscal year 1983.

Senator **Wilson**. Chairman Goldwater before he left was asking a question, I think he was asking why you would not use the TR-1 as a platform.

General **Marshall**. Sir, the biggest problem in using the TR-1 for Joint Stars is weight. We had two development models that were flying on F-111's, one of those weighed almost 4,000 pounds and the other one weighed about 3,000 pounds. Now, it looks like the maximum that we can put on this airplane is about 1,900 pounds. So, it will be a significant job to resize that radar.



TR-1

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
* WPN SYS PROC	113.5	155.0	213.1	149.4	293.4	924.4**
QUANTITY BUY	4	4	5	4	12	29**
DELIVERIES	3	3	4	5	15	30

FY 84
WPN SYS
PROC REQUEST

$ 213.1M

AIRCRAFT	113.6
SENSORS	96.6
ADV BUY	10.3
PEC SUPT	3.3
ADV BUY CREDIT	-10.7

*INCLUDES AIRCRAFT AND RECCE SENSORS ONLY

**TOTAL PROGRAM IS 35 AIRCRAFT AT $1083.2M

General **Gorton**. Another very important aspect of that is that, as stated, the TR-1, if you used TR-1 as a platform, you also need a ground processor to go with it to handle the data, whereas the C-18 has onboard processing and so has more flexibility.

Senator **Wilson**. So, then this has an entirely different mission.

General **Gorton**. The TR-1, sir?

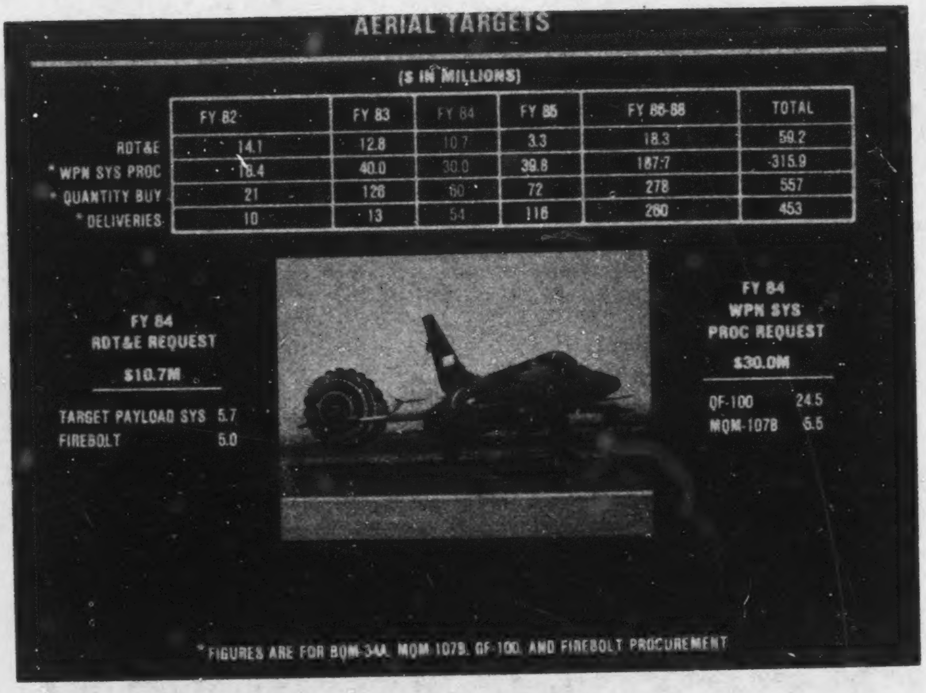
Senator **Wilson**. Yes.

General **Gorton**. At the present time it is devoted to the PLSS system for locating emitters and the ASAR system, for surveillance, reconnaissance.

General **Skantze**. It can also carry intelligence sensors, you know, electronic signal collectors and usually data link that information down to the ground as well.

Senator **Wilson**. There is an item ADV buy. Is that a credit?

General **Marshall**. Yes, sir, that is against the next year. Many of our programs require funding for more than 1 year because of the leadtimes it takes to get items. So, in 1984 that advance buy, the $10.3 million is against the 85 aircraft. Now, the advance buy credit means back in 1983 we pay $10.7 against those 85 airplanes. So, that is just the way we handle our long lead requirements.



AERIAL TARGETS

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
RDT&E	14.1	12.8	10.7	3.3	18.3	59.2
* WPN SYS PROC	18.4	40.0	30.0	39.8	187.7	315.9
* QUANTITY BUY	21	126	60	72	278	557
* DELIVERIES	10	13	54	116	260	453

FY 84
RDT&E REQUEST
$10.7M

TARGET PAYLOAD SYS	5.7
FIREBOLT	5.0

FY 84
WPN SYS
PROC REQUEST
$30.0M

QF-100	24.5
MQM-107B	5.5

* FIGURES ARE FOR BQM-34A, MQM-107B, QF-100, AND FIREBOLT PROCUREMENT

General GORTON. The next program reviews a series of target drones. These systems are crucially important to the training of our aircrews. It allows our aircrews, our fighter aircrews to fire live missiles in a program down at Eglin Air Force Base in Florida to maintain their proficiency and to execute actual missile firing against realistic targets. There are a series of drone targets, modified fighters to drone configuration the F-102, an old air defense interceptor and the F-100 aircraft, an old tactical fighter aircraft, have been modified as radio-controlled drones to give them the characteristics of potential enemies. There are other drones such as this particular drone here that are more specifically designed, there is a drone, tactical fighter, QF-100.

The next program we will look at is the MC-130H. This is the combat talon aircraft which is devoted for special operations use. It is used for long-range special operations work.

Senator WILSON. What is the range, General?

General GORTON. It has an unrefueled combat radius of 1,400 nautical miles, so 2,800. But it is an air-refuelable vehicle. So, it is deployable to great distances.

Senator WILSON. What is its capacity?

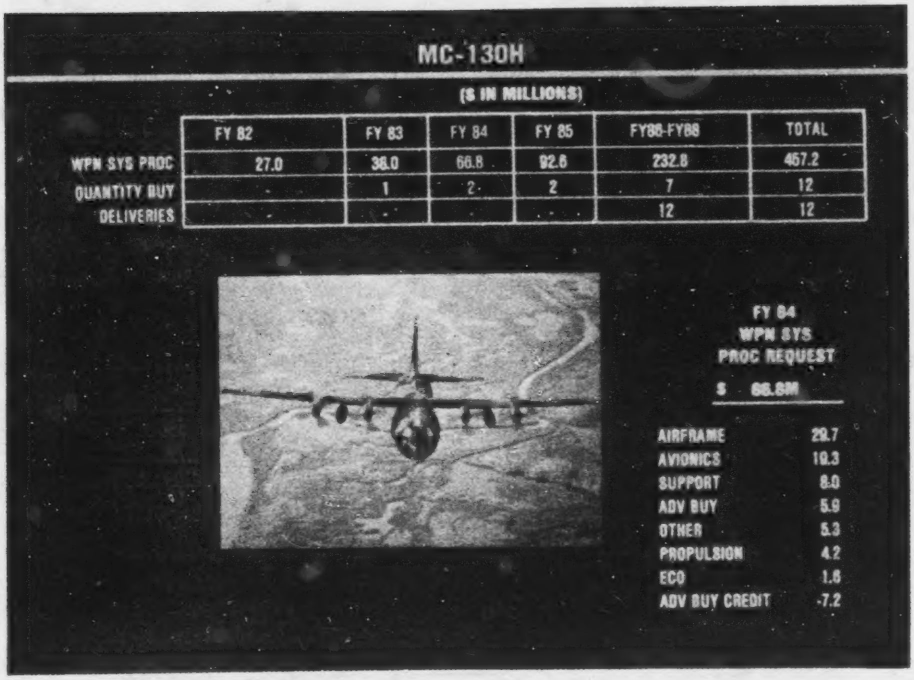
General GORTON. Say again, sir?

Senator WILSON. What is its capacity?

General GORTON. The fuel capacity?

Senator WILSON. No, not fuel.

General GORTON. It is a highly modified aircraft internally as to the number of passengers it carries. But it is a very highly modified troop-carrying aircraft per se, it is a modified version of the C-130.



MC-130H

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
WPN SYS PROC	27.0	38.0	66.8	92.6	232.8	457.2
QUANTITY BUY	-	1	2	2	7	12
DELIVERIES	-	-			12	12

FY 84
WPN SYS
PROC REQUEST
$ 66.8M

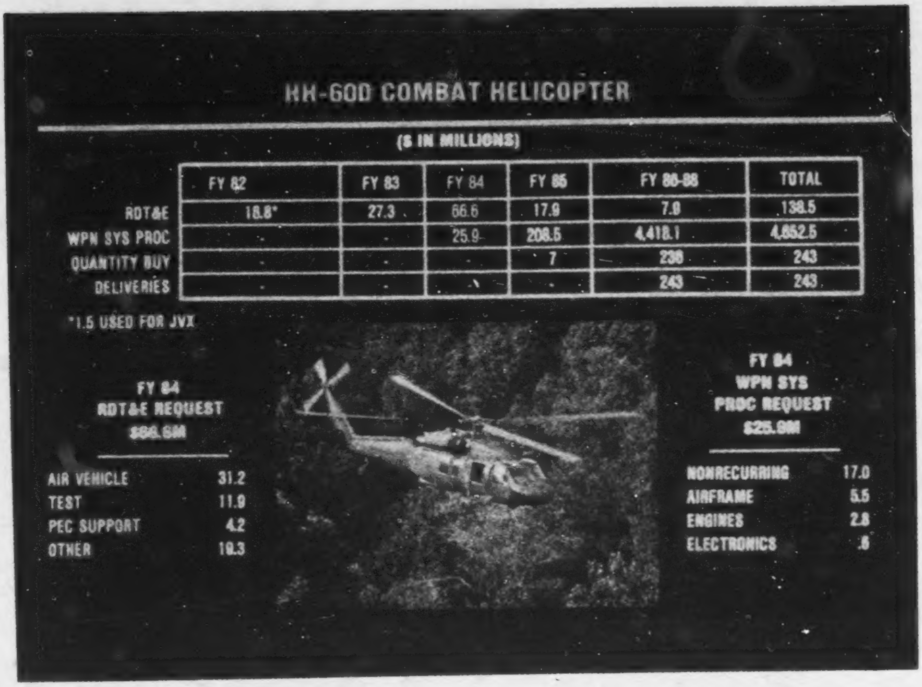
AIRFRAME	29.7
AVIONICS	19.3
SUPPORT	8.0
ADV BUY	5.9
OTHER	5.3
PROPULSION	4.2
ECO	1.6
ADV BUY CREDIT	-7.2

General MARSHALL. I might say in answer to your question, the configuration is easily modifiable. Say, you have a team of people to rescue someone, there are pallets that you can move on the airplane to help accommodate those kinds of people.

General GORTON. The next program that we will look at is the HH-60D helicopter. This is a helicopter that is very similar to the UH-60 which is being procured in quantity by the U.S. Army. The HH-60D is being procured by the U.S. Air Force to replace aging combat rescue helicopters and special operations force helicopters.

Senator WILSON. What is the unit cost of it?

General SKANTZE. In then-year dollars the procurement cost is $20.1 million.



HH-60D COMBAT HELICOPTER

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY 86-88	TOTAL
RDT&E	18.8*	27.3	66.6	17.9	7.9	138.5
WPN SYS PROC			25.9	208.5	4,418.1	4,652.5
QUANTITY BUY				7	236	243
DELIVERIES					243	243

*1.5 USED FOR JVX

FY 84
RDT&E REQUEST
$66.6M

AIR VEHICLE	31.2
TEST	11.9
PEC SUPPORT	4.2
OTHER	19.3

FY 84
WPN SYS
PROC REQUEST
$25.9M

NONRECURRING	17.0
AIRFRAME	5.5
ENGINES	2.8
ELECTRONICS	.6

Senator WILSON. How is that split?

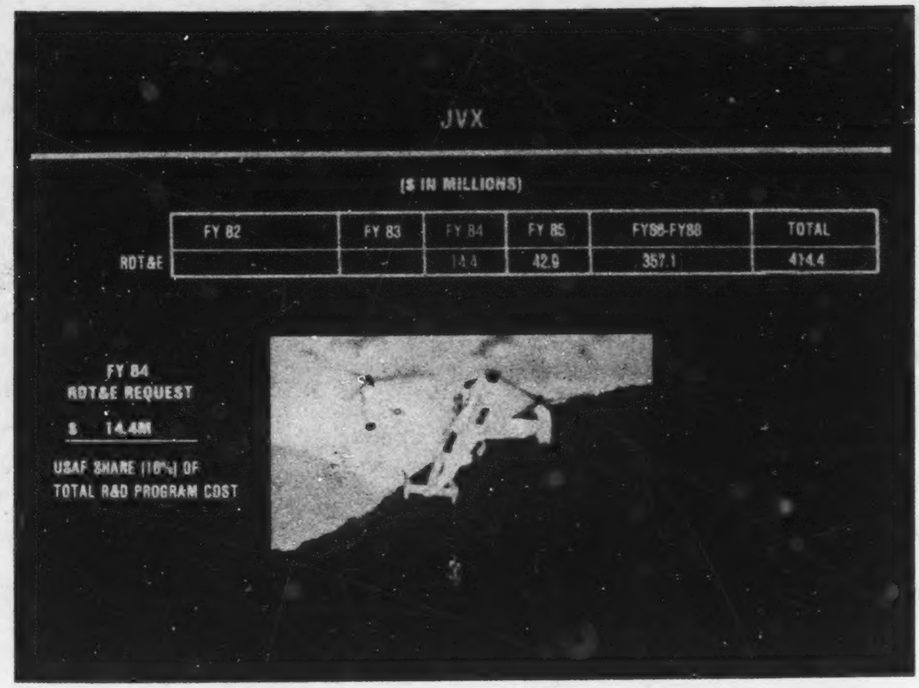
General SKANTZE. I would guess the airframe is probably half of that. I can supply it for the record. It is about half. We put in the radar; there is a forward-looking infrared gear and some other special communications things; air refueling capability.

General GORTON. This is an external fuel tank. This is a much longer range version of the Army helicopter. We need longer range for both SOF missions and combat rescues.

The next program, sir, is a joint program, it is exploration of vertical lift technology. The Navy is in the lead on this program, the JVX aircraft is a tilt-rotor design as indicated in the picture. It has much higher speed with longer range than a normal helicopter. The Air Force is looking at potential procurement in the mid-1990's of up to 200 of these aircraft. The basic requirement for procurement in the early years is for the U.S. Navy, and the Army is also looking at procuring these vehicles. We are currently in the initial stages. There is joint agreement and staff between the Army, the Air Force, and the Navy and we are sharing, the Air Force shares 16 percent of the total cost of this program, the Navy 50 percent, and the Army picking up the remainder.

Senator WILSON. And we are looking at an acquisition of what number of these?

General GORTON. We have not defined it fully because we are at the tail end of the program, the Navy and the Army are coming first. But we are looking at an objective of about 200. These aircraft would replace part of our SOF C-130 force in the mid-1990's and part of the remaining helicopters in the SOF force for longer range SOF missions with a vertical takeoff and landing capability.



JVX

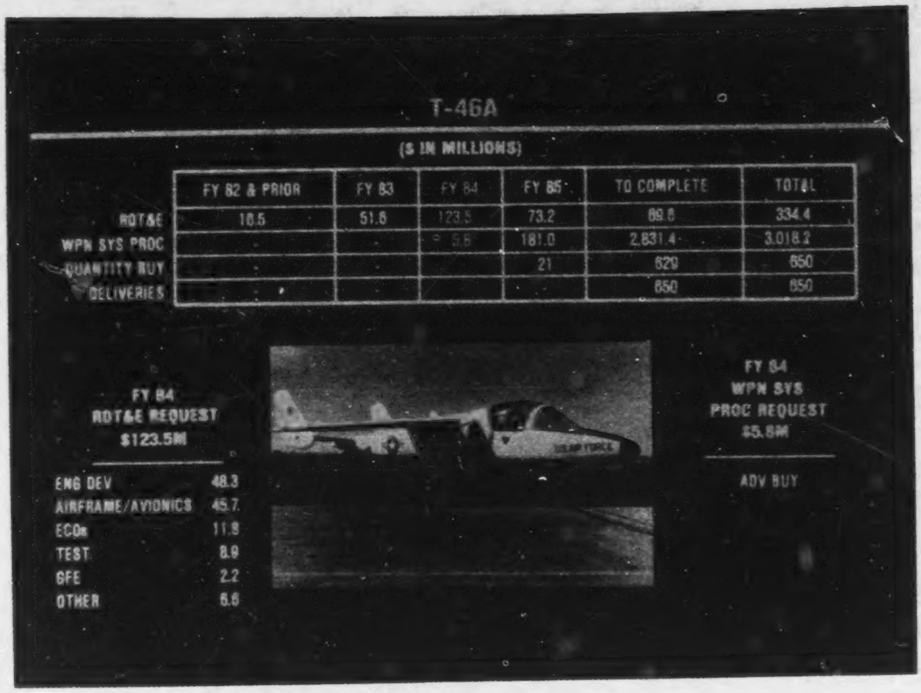
($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E	-	-	14.4	42.9	357.1	414.4

FY 84
RDT&E REQUEST
$ 14.4M
USAF SHARE (16%) OF
TOTAL R&D PROGRAM COST

General GORTON. It is $14.4 million. That represents the Air Force share, only the Air Force share of 16 percent. That is the total program for 1984.

The next program is the T-46A. It is designed to replace our basic primary trainer aircraft. The T-37 which it replaces is the aircraft used in basic pilot training. Our total program for this aircraft is an eventual buy of 650.



T-46A

($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
RDT&E	16.5	51.6	123.5	73.2	69.6	334.4
WPN SYS PROC			5.8	181.0	2,831.4	3,018.2
QUANTITY BUY				21	629	650
DELIVERIES					650	650

FY 84
RDT&E REQUEST
$123.5M

ENG DEV	48.3
AIRFRAME/AVIONICS	45.7
ECO*	11.8
TEST	8.9
GFE	2.2
OTHER	6.6

FY 84
WPN SYS
PROC REQUEST
$5.8M

ADV BUY

US AIR FORCE

Senator WILSON. What will you do with the T-37's?

General GORTON. They will be relegated to the boneyard. They will be deactivated from the Active Force.

General SKANTZE. They are old, nonpressurized and very inefficient.

Senator WILSON. Is there a market for them?

General GORTON. There may be a market in FMS. We have sold varieties of the T-37's but they have to be upgraded. There is a variety that is a small tactical fighter. But at the current time we plan to retire the aircraft.

Senator WILSON. Senator Kennedy has to leave and he has a question, not on anything you have shown us today, but the F-15.

Senator KENNEDY. I want to review the new F-15 requirements. As I understand it, there is priority being given to the F-15 to assist in continental air defense. Am I correct?

General GORTON. Yes, Senator Kennedy. We are modernizing. There are 15 squadrons of air-defense fighters in the United States, 5 of them are in the Active and 10 in the National Guard Force. The five active squadrons are planned to be modernized with F-15's. One squadron has converted already. The rest currently are manned with F-106 aircraft which have an average age of about 20 years old and are rapidly becoming unsupportable.

We already have modernized one air defense squadron at Langley Air Force Base, the 48th Fighter Interceptor Squadron. It will also be the first squadron to handle the ASAT—antisatellite requirement. The second squadron is due to be modernized next year.

Senator KENNEDY. How has the military situation changed to justify giving more priority to continental air defense?

General Skantze. I think that the administration felt very strongly that we have neglected it to the point where we have very deficient capability in terms of being able to handle an attack. The Soviets have continued to build the Backfire bomber in substantial quantity. They now have a new bomber, the Blackjack which is bigger than the B-1B, which is in flight test.

So, I think the decision was made that we ought to have a minimal capability to be able to handle the air-breathing threat. That was embodied in the decision to upgrade the distant early warning line radars on top of Canada; to build two over-the-horizon radars, one which is in Maine, the other will be on the west coast. At the same time procuring an additional 12 AWACS to do the airborne long-range surveillance and use the F-15 which has a very superb long-range radar to be the interceptor force that went with that.

Construction of that force was deemed minimal required to reasonably address the air-breathing threat.

Senator Kennedy. I am trying to define how the Air Force's request for the additional four tactical squadrons, a mix of F-15's and F-16's fits with the request for the additional F-15's for continental defense. I wonder why those additional four squadrons could not be used for the continental defense mission.

General Skantze. The goal of the 40-wing force structure is to try to redress some of the total imbalance in terms of looking at the central region in Europe and the forces we face in the Warsaw Pact. It is difficult and there is a lot of augmentation that has to come from the continental United States to go to Europe in the event of a crisis. It is difficult to conceive that if we had such a crisis we would not at the same time require the dedicated service of, say, 200 F-15's assigned to the continental air defense.

I could not conceive of a situation where, if we had that kind of crisis in Europe, we would not at the same time want to have that capability for a continental air defense.

General Gorton. With regard to your point, sir, about being extra or above requirement, quite the contrary, sir. The additional forces, those four wings, are needed and demanded by the overseas commanders to meet the threat as they view it. We are very substantially short of our goal and compared to the 110 wings that we face from the Soviet tactical forces. The 40 wings has been a very modest goal since 1974.

Senator Levin. Mr. Chairman, I wonder if I could pursue the F-15 issue for just a moment.

Senator Wilson. Of course.

Senator Levin. I am sorry I was not here yesterday to discuss it. But on the point that Senator Kennedy is making relative to the F-15's, I gather the issue really is whether we should wait for the F-16's to come onboard and save the money since the F-16 is a lot cheaper, instead of investing in the more expensive F-15's at this time.

I am just wondering why do you feel we need the more expensive F-15's now instead of waiting a few years for the enhanced F-16 which will save a significant amount of money. What is there now that exists? They do not have the Blackjack. Is that the name of the new bomber?

That will not be onboard the Soviet inventory until 1987 or so. By that time we will have the enhanced F-16's. What is there now that we are afraid of?

General SKANTZE. The F-15 has a radar which has twice the range or a little more than an F-16. Now, if you are talking about the continental United States and the Canadian reaches, that radar capability allows you with fewer airplanes to surveil and sweep out a much greater area.

Senator LEVIN. Is it not true that if the F-16 were available now that we would go with the enhanced F-16 for air defense, if it was available now?

General SKANTZE. I am not sure I would make that statement.

Senator LEVIN. In other words, even if we had the AMRAAM, that enhancement on the F-16 now, you would still be recommending F-15's for air defense?

General SKANTZE. Well, that is kind of hypothetical. The reason we want F-15's at this point is because we need to build up that inventory of continental defense fighters as rapidly as we can. Furthermore, the F-15 uses the AIM-7M missile. The F-16 will only use the AMRAAM. When we start to produce AMRAAM missiles we are still going to have a lot of AIM-7M missiles and the F-15 is still going to be equipped with those.

Senator LEVIN. Are we going to be building the F-16 with AMRAAM for air defense?

General GORTON. Yes, sir.

Senator LEVIN. Why not wait?

General SKANTZE. Well, it will have it as a swing mission.

Senator LEVIN. One of its missions will be air defense.

General SKANTZE. Partially. You can swing it from air defense to air-to-ground. The only dedicated air defense fighter is the F-15.

Senator LEVIN. But at least one of its missions will be air defense.

General SKANTZE. Could be, yes.

Senator LEVIN. Is it not designed so that air defense is one of its missions?

General SKANTZE. But we use it as a swing fighter.

Senator LEVIN. I understand it has other missions.

General SKANTZE. That is correct.

Senator LEVIN. Is it not designed so that one of its missions is air defense?

General GORTON. It is designed for theater air defense, Senator, you are absolutely correct, and it is a swing aircraft, it can do air-to-ground and air defense as well.

Senator LEVIN. You mentioned the Backfire bomber. Would you agree with this statement that the Backfire bomber is currently intended for theater attack in Europe and Asia?

General SKANTZE. I am not convinced of that.

Senator LEVIN. That is what the document that the Pentagon just issued, entitled "Soviet Military Power 1983" said. You do not agree with that?

General SKANTZE. I will stand on my statement.

Senator WARNER. Just for the record, the other gentleman nodded his head, General Gorton, as if you concurred. Would you clarify that?

General GORTON. Concur with General Skantze's assessment of the Backfire?

Senator WARNER. I assume that was what you were doing.

General GORTON. Yes, sir.

Senator WARNER. I just wanted to clarify that.

General GORTON. That aircraft has the capability to be deployed, unrefueled, into the United States.

Senator WARNER. Let us expand on that because heretofore in the SALT II debate refueling was an integral part of that discussion.

General GORTON. Yes, sir.

Senator WARNER. I think we should clarify that for the record because as we debate a variety of issues here, such as the freeze and modernization programs, this question arises. It is a timely question raised by my colleague—time and time again. So, let us take the Backfire. Perhaps it was originally designed for theater missions. But my recollection is, refueling probes, that was the first indication that it was going to have an expanded role. Take us through that scenario. It was introduced what year? Take us through the evolution.

General GORTON. We can take that for the record as the evolution of the Backfire itself. But I could speak to its capability. It is really the point as to how the Soviets plan to use it. It certainly has the capability to be used as an intercontinental bomber. It can deploy right through and land in bases in the Caribbean, if they so choose. The aircraft possesses the capability. It depends on how one uses it.

Senator WARNER. What is the versatility of the aircraft; what is its dependence on refueling; how many of them are equipped for refueling?

General GORTON. As far as I know, they are [deleted] refueling. But I would have to take that point, sir, for the record.

Senator WARNER. Does anyone possess the knowledge, then supplement it for the record.

[The information follows:]

SOVIET BACKFIRE

Since [deleted] air refueling probes on all of their Backfire bombers. [deleted] on each bomber and we believe the [deleted] is also present. Within [deleted] hours the Soviets could [deleted] the air refueling probe on their Backfire bombers.

General GORTON. I do not know. I believe they are [deleted] refueling.

General SKANTZE. I think there was sort of an agreement where they took the refueling probes off. [Deleted.]

Senator WARNER. The probes were removed.

General SKANTZE. [Deleted.]

Senator WARNER. And to take a mission from the Soviet Union to Conus and back, what would be the scenario for that aircraft?

General SKANTZE. I think they would come on over the pole and depending on whether they wanted to fly low or high, stay out of the radar detection that currently exists, they could get refueling just before they got to the early warning line in mid-Canada, come down, deliver their ordnance, go back, and get refueled on the way out.

Senator WARNER. Refueling in and out. Do the Soviets have the tanker that is capable of doing that refueling?

General SKANTZE. I believe so.

Senator WARNER. I realize that is primarily in the intelligence operational area as opposed to the procurement area, but I think it is important that we put it in the record.

General SKANTZE. All right, sir.

Senator WARNER. I thank the gentleman. I did not mean to interrupt you.

Senator LEVIN. No, I think that is helpful. I just want to get back to where I was heading.

Do you know whether the CIA classifies the Backfire bomber as a long-range bomber?

General SKANTZE. No, I am not aware of it.

Senator LEVIN. Maybe you ought to get together with the CIA, this issue is pretty critical.

General SKANTZE. Well, I think there is always a difference of opinion.

Senator LEVIN. Would you agree with this statement—let me see if I can bat 500 on that—that a high-risk surprise bomber attack certainly runs counter to the conservative planning style consistently demonstrated at all levels by the Soviet military exercises?

General SKANTZE. I do not know what you mean by "high risk surprise bomber attack."

BOMBER ATTACK AGAINST UNITED STATES A HIGH RISK

Senator LEVIN. Well, it is high risk, is it not, a bomber attack against the United States? It is certainly higher risk than an ICBM attack.

General SKANTZE. It depends on how you deploy. If you are in a position where you decided you wanted to go to all-out nuclear war than selectively, if you could sneak some bombers in you could hit some key places before you laid down SLBM's. They would do some critical damage to command posts.

Senator LEVIN. Are you suggesting that a likely scenario is to fly the bombers in first followed by the SLBM's?

General SKANTZE. I said a selective number of bombers. Right today you could sneak them in.

Senator LEVIN. Without warning. You would not pick it up on the radar.

General SKANTZE. I think you could do it.

Senator LEVIN. Is there not high risk involved in that scenario?

General SKANTZE. Well, what I am saying is, it has already been decided to go to nuclear war. So, now it is a question on how he wants to do the opening gambit.

Senator LEVIN. [Deleted.]

General SKANTZE. [Deleted.]

Senator LEVIN. Well, again, the CIA disagrees with you on that. [Deleted.] I guess it is a matter of judgment.

You have to decide, Mr. Chairman, whether or not we would rather save the bucks—and there are big savings in F-16's over F-15's—and using F-16's for everything. They can be used with

AWACS and give us that same looking-outward capability that you referred to before on the F-15's.

General SKANTZE. Yes, but you do not have quite the same flexibility. I was with the AWACS program, and I did a lot of work on directing the F-15. The longer range radar a fighter has, the faster you can direct more of them because once you point them in the right direction if they have enough radar capability, they find the target. So, the longer the range of radar in the interceptor the faster and more efficiently you can use it.

Senator WARNER. Let me interrupt for one thing. Please, continue with the question. But general, you have been Chief of Research and Development. The chances are you and your colleagues do not try to keep abreast with some of these intelligence evaluations. Consequently, feel free to just say that you will supply it for the record or consult, and this committee should bring back other witnesses who are more current.

I fully respect the enormity of the task that you have, which I think precluded some of the in-depth study that you would like to take in these other areas, if you had the time.

General SKANTZE. I am just saying that if one were to try and build an all-out war scenario it seems to me if you contemplate that it is to your advantage to look at every aspect of it that would work to your benefit.

I am simply saying I would not rule out using a small number of bombers.

Senator LEVIN. Going back to the F-16, they are assigned to air defense; this wing is assigned to air defense.

AMRAAM

General GORTON. That is correct, modernization of the Air National Guard forces. We are currently programing assignment of F-16's, given that AMRAAM comes on line at that time.

Senator LEVIN. Do you still expect the AMRAAM online?

General GORTON. We are programing to do so; yes, sir.

Senator LEVIN. So, to get a direct answer to my question, you will be assigning F-16's with the AMRAAM to air defense by 1987.

General GORTON. That is programed, yes, sir.

Senator LEVIN. Do you know how much we would save per copy of an F-16 with an AMRAAM over an F-15?

General SKANTZE. Probably about $12 million a copy. But you have to recognize that is predicated on the difference in production rate.

Senator LEVIN. I assume. Getting back to my hypothetical question—and it is indeed hypothetical and very important—if we have F-16's available now with AMRAAM, would you not buy them for air defense today?

General MARSHALL. Sir, we have to make a radar modification. The F-15 has a much longer radar range and a much more capable radar. Now, we do have radar modifications planned for the F-16 but they are not in yet.

Senator LEVIN. When will they be in?

General MARSHALL. I think they start going in about 1 year from now.

Senator **Levin**. If we have the F-16's with the AMRAAM and the radar modification now, would we be buying them for air defense now?

General **Gorton**. The F-15 represents a significant air defense capability over the F-16, even with the F-16 being AMRAAM equipped—range, radar.

Once again dealing with your hypothetical question I want to point out, Senator Levin, something I made a remark about in the initial response to your question that must be considered—not on a hypothetical basis. AMRAAM will not be here until 1987. It will take some time to get those aircraft up to speed. In the interim we have a substantial cost associated with trying to maintain F-16's that will be on the average 25 years old.

Senator **Levin**. Has there been a comparison of those costs relating to savings, has the Air Force made those cost analyses?

General **Gorton**. No, because we are programing F-15's to replace them. I know that in our discussions on maintaining the F-106 our logistics community has said time and time again that they are becoming nonsupportable.

Senator **Levin**. Let me ask my hypothetical question again. If the F-16's with the advanced radar and the AMRAAM were available now, would you be buying them now for air defense?

General **Gorton**. Let me say this, Senator Levin, we would not buy the first two squadrons, they are going to be ASAT capability. We already have one F-15 squadron in. That is a very difficult question to deal with because those factors just are not at hand. We do not have them.

Senator **Levin**. The question that Congress asks is whether we wait. You are saying we should not wait, I understand your position. We are exploring whether we should. We have to make that decision. We have to make it on kind of intelligent information, we cannot pull an answer out of the air. We need your help. I am tying to get your help and am asking the question again, if they were available now, would we be buying them now?

General **Skantze**. You know, we devise a program on force structure on the basis of the threat as we see it today. We do not have the F-16 with the AMRAAM and we are several years away from it.

We feel strongly that we need to flesh out the air defense squadrons with a much more capable airplane. The F-15 is here, it is available, and can do the job.

Senator **Levin**. The strength of your feelings is clear, they are legitimate and reasonable and they ought to be factored into our feelings. But we have to reach conclusions of our own.

General **Skantze**. Exactly.

Senator **Levin**. In order to be able to reach those conclusions I ask my question again, if the F-16 were available now with enhanced radar and the AMRAAM, would we be buying them now for air defense?

I ask that question because it is relevant to my view, and I have to make a decision here as to whether we can save money by waiting and buying the enhanced F-16 or whether to go ahead with the F-15.

I have to vote on this. Once in a while I vote intelligently. I am not excessive in that regard but I do my best. I want the answer to that question in order to exercise my vote. So, would you answer it?

General SKANTZE. Well, it is a hypothetical question and we are building a force structure not based on hypothetical questions.

Senator LEVIN. It is not hypothetical to me.

General SKANTZE. I realize that, but you said it was hypothetical.

Senator LEVIN. It is a very real question for us. It is a question on whether we ought to wait. Whether we wait depends on whether or not if they were here. In your judgment whether we should wait might depend on whether we buy the darned things if they were here now. We are going to buy them for air defense, they were designed for air defense for the Air National Guard. Why not wait?

The answer was because they have Backfire bombers. Then we got into the whole question on the Backfires whether they are long-range bombers and all that. I understand that is a critical issue. Is a bomber strike against us the likely way that anything could start? Is that such a high-risk effort that it could not start that way, it would start with the ICBM's? Does it buy us anything—it would buy us something? Could it buy us enough given this budget?

We are going to make cuts in this budget, there is no question about that. The question is, where are we going to make these cuts. We have to make them as intelligently as we can. We have to look at all the priorities, focusing on air defense. You focus in air defense on the F-15, I admire you for that, you should be doing it.

But we have to face the question. You are carrying out your mission, fine. We need an advocate for the F-15. Every position is reasonable and this is reasonable and it should have an advocate.

But we have to make the judgment as to whether or not finally we are going to use them now for air defense. I need an answer to that question.

Mr. Chairman, I think that I am really entitled to the answer to that question whether or not if these were available now you would be buying them now for air defense. I think it is a reasonable question. See, I think your position is reasonable. I disagree with it but I think it is a reasonable position and you are advocating it well.

But in order to determine what we should do, I think my question is reasonable. Let me try again, would you buy it if they were available now?

General SKANTZE. The best thing I can say is, if they were available now we would have to face the issue within the Air Force to determine what we need.

Senator WARNER. Let me ask the question, how would you assess our current air defense capability?

General SKANTZE. Well, I think at the moment it is fairly deficient. We have the F-106's which, as General Gorton pointed out, are quite old. We supplement that with some of our older F-4's. The dew line up in Canada has very significant gaps. [Deleted.]

Once you get down into the inner regions of Canada you can keep coming on down. [Deleted] particularly at low levels. If someone on a dedicated basis wanted to bring some bombers through there, I am convinced he could.

I think that is the reason that the administration decided to readdress the air defense problem and made a commitment to upgrade the radar, as well as the forces designed to carry out the defense mission.

Senator **Levin**. I have a couple more questions, Mr. Chairman. I am sorry to interrupt you.

Senator **Warner**. No, that is all right.

Senator **Levin**. I think I interrupted your conversation.

The affordable acquisition approach, A^3, which some retired Air Force generals have proposed, concludes that the Air Force is going to have to start planning, budgeting, and managing better. They defined that there is somewhere between 11 and 30 percent underfunding in the procurement program between fiscal year 1983 and fiscal year 1988.

I am wondering whether or not you had access to that study and whether or not you agreed with it in that regard. And then I will ask you about another aspect of it.

General **Skantze**. I did have access to that study and personally know the people who did it. I think it is fair to characterize that study as a historical perspective. They went back and looked at an enormous number of programs, looked at efficiencies and inefficiencies, how we managed those programs.

I think that their characterization of underfunding was related to their estimate of what the procurement budget was and what the ceiling on that budget was. If I remember, they talked about the procurement budget being on the order of like $15 billion and if that were to persist we would have severe problems. I agree with that.

But the point is, our procurement budget is considerably in excess of that. For example, in 1984 we have $22 billion in aircraft procurement, we have $8 billion in missile procurement and I think about $6 billion in other.

So, their perspective was based on assuming that we have a limitation on the procurement account on the order of $15 billion. I think it is clear in the case of the Department in the budgets that we have seen in 1982, 1983, and 1984 that there is sufficient procurement funding to do those programs. I do not believe we are underfunded.

Senator **Levin**. You did not add numbers, though, for your extra dollars. There are additional items you are buying for additional dollars. You have not increased it per copy.

General **Skantze**. No. But as I read the A^3 study from a historical perspective what they were saying is, if you are constrained in your procurement account you will never be able to do all the things that you plan to do. That is a perfectly correct statement with which I agree.

Senator **Levin**. You did have access to that study and you feel that it is more historical than it is objective?

General **Skantze**. Yes, sir.

Senator **Levin**. It is really looking backward rather than forward.

The other part of that study says that we ought to cancel some items. As to what we might cancel if we had to, and we gave most priority to the problems and programs of this subcommittee, that we looked at our money and prioritized these—the medium range air-to-surface missile, how do you pronounce the acronym for that?

General **SKANTZE**. MRASM.

Senator **LEVIN**. MRASM. The WASP—wide area antiarmor, the Maverick, the HARM, the LANTIRN.

General **SKANTZE**. That is correct.

Senator **LEVIN**. Would you prioritize those five items for us?

General **SKANTZE**. I think they are all part of our program and all the funding to do them is in there.

Senator **LEVIN**. Would you be willing to prioritize them for us?

General **SKANTZE**. I think we need them all.

Senator **LEVIN**. If we are going to drop any of them, would you give us any advice?

General **SKANTZE**. I feel that this committee is perfectly capable of making the judgment that it feels it needs to make.

Senator **LEVIN**. Well, I do not know about our capability, but we will. In making that judgment we can use all the help we can get from you folks who live with this stuff every day. So, if you can give us any advice as to which of those have lesser priority and greater priority I think it would be helpful. Otherwise we are put in a position of making these decisions without the benefit of your experience. I do not think that is the way we ought to decide things.

Would you be willing to say which of those high priority items is higher than others?

General **SKANTZE**. No. I think we put together a very carefully balanced program.

Senator **LEVIN**. Did you this morning state that MRASM had a lower priority?

General **SKANTZE**. No, I said in some elements of the Air Force it is considered lower priority; in other elements it is considered higher.

Senator **LEVIN**. Thank you very much.

Senator **WARNER**. As I understand it, General, you have completed all but about half a dozen of your program items here. Senator Levin, what would be your pleasure, would you like them to go through it or put these items into the record?

Senator **LEVIN**. I have to leave, Mr. Chairman, either way. I do have additional questions for the record but I am not able to stay.

Senator **WARNER**. Then, will you continue with those programs?

General **GORTON**. Yes, sir.

Senator **WARNER**. Go through them briefly and then supplement the record.

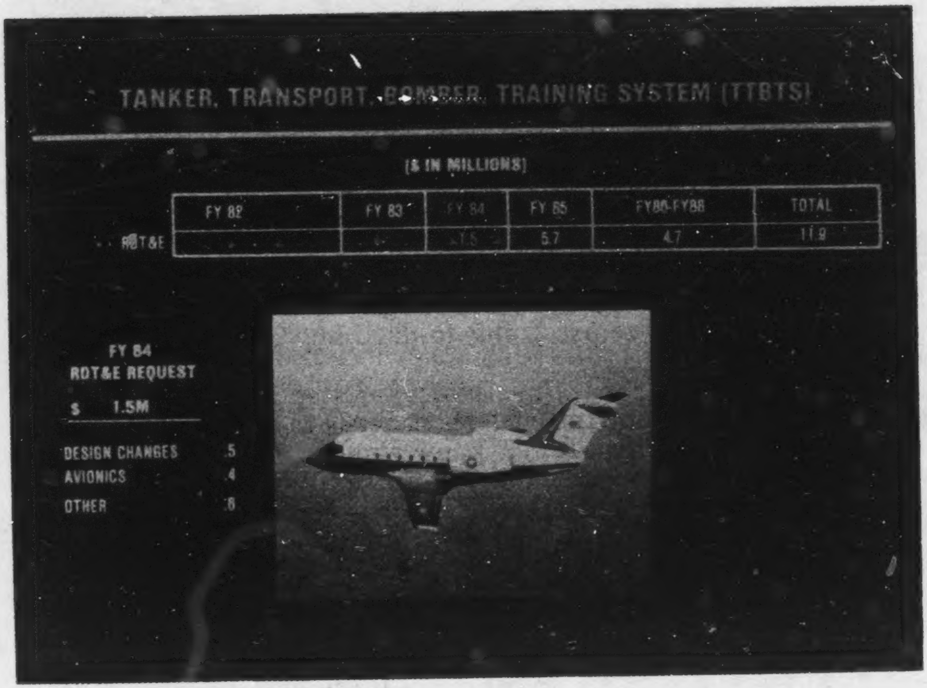
General **GORTON**. Yes, sir. This program is called tanker, transport, bomber training system is a program that we would use to train——

Senator **WARNER**. I remember this from last year, it was driven by fuel requirements, it is cost effective. I remember it well.

General **GORTON**. It is a very limited amount of funds.

Senator **WARNER**. Where are you on that?

General **Gorton**. This is the cost profile of what is in the President's budget for tanker, transport, bomber, training.



TANKER, TRANSPORT, BOMBER, TRAINING SYSTEM (TTBTS)

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E		-	1.5	5.7	4.7	11.9

FY 84
RDT&E REQUEST
$ 1.5M

DESIGN CHANGES	.5
AVIONICS	.4
OTHER	.6

Senator **Warner**. Will this aircraft have any mission other than just training?

General **Skantze**. No, it will be primarily used for multi-engine training.

Senator **Warner**. I notice the configuration there, does it have a passenger capability?

General **Skantze**. We are thinking about leasing a commercial airplane.

Senator **Warner**. I see.

General **Skantze**. So, that is what we would wind up with.

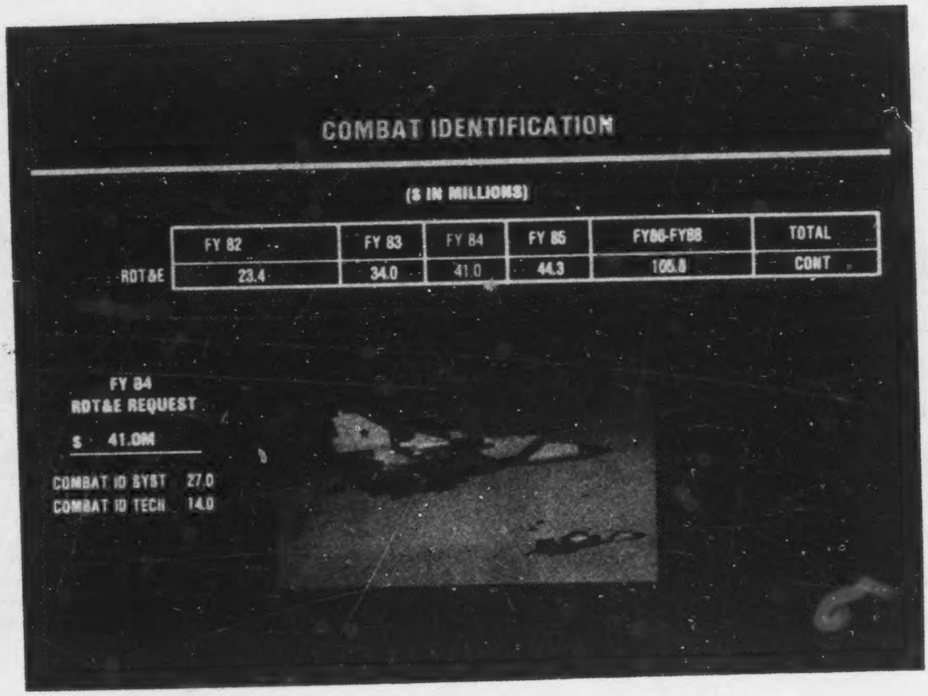
Senator **Warner**. What is that commercial aircraft?

General **Gorton**. I am not sure. We just used it as a generic picture. So, I do not know what the specific airplane is. We would take a standard business jet off the shelf.

Senator **Warner**. And is that now on production?

General **Gorton**. An aircraft that is now on production, yes, sir.

The next program, very important, is our efforts to upgrade our combat identification systems to determine who is friendly and who is not. A major program involved in that is the upgrading of our identification system in our aircraft, both United States and NATO that is called the MARK XV. It will provide us a more complete structure for identifying friendly aircraft. We are also working on systems to identify, positively identify, enemy aircraft.



COMBAT IDENTIFICATION

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E	23.4	34.0	41.0	44.3	105.8	CONT

FY 84
RDT&E REQUEST
$ 41.0M

COMBAT ID SYST	27.0
COMBAT ID TECH	14.0

Senator **Warner**. What is your IOC on that?

General **Gorton**. The IOC for the MARK XV is in the late 1980's. I can provide that specifically for you.

Senator **Warner**. When will you start your Mod program?

General **Gorton**. Sir?

Senator **Warner**. When will you start your Mod program?

General **Gorton**. The Mod program reflected in that funding is principally to upgrade our MARK XII, the current system, to increase its capability and start the preliminary development of the MARK XV.

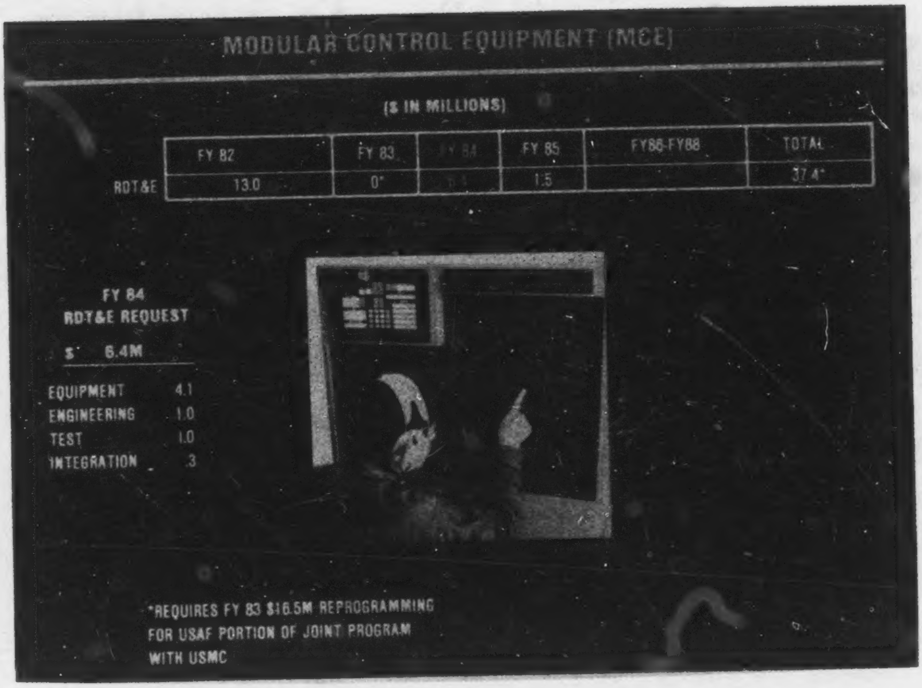
Senator **Warner**. I see.

General **Skantze**. The key thing we are doing with MARK XV is, we have been working to get an agreement with NATO to use the same kind of IFF, the same frequency.

Senator **Warner**. I would think that is sensible.

General **Skantze**. Hopefully within the next 30 days we will get that all pinned down.

General **Gorton**. The next program is a tactical modular control equipment. It is designed to replace all the shelters that we have for our tactical control system, the 407L, which is rapidly becoming unsupportable.



MODULAR CONTROL EQUIPMENT (MCE)

($ IN MILLIONS)

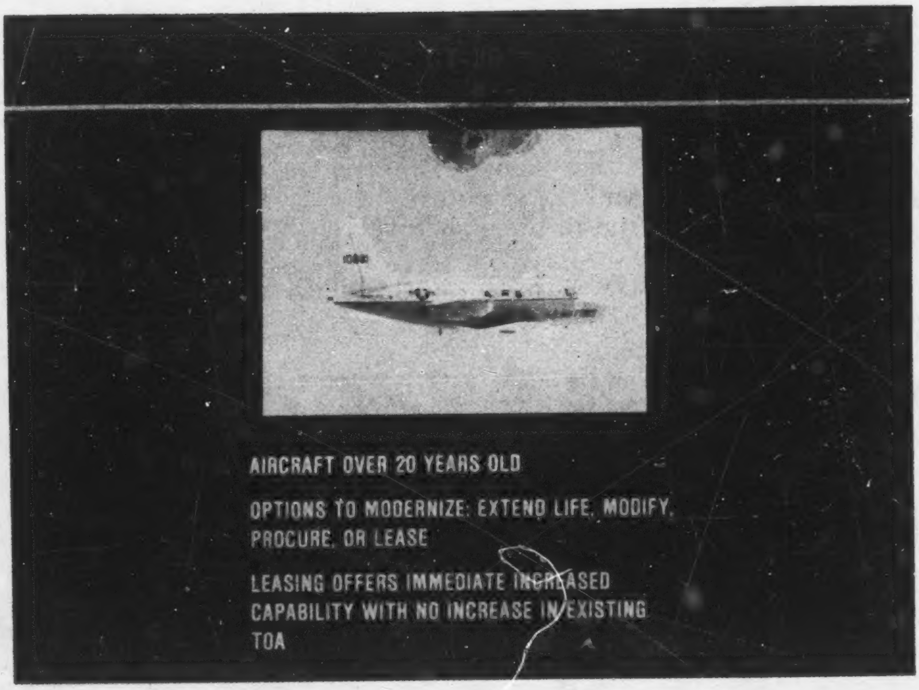
	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
RDT&E	13.0	0*	6.4	1.5		37.4*

FY 84
RDT&E REQUEST
$ 6.4M

EQUIPMENT	4.1
ENGINEERING	1.0
TEST	1.0
INTEGRATION	.3

*REQUIRES FY 83 $16.5M REPROGRAMMING
FOR USAF PORTION OF JOINT PROGRAM
WITH USMC

This is a joint program with the U.S. Marine Corps, they are buying these shelters, the tactical shelters to replace their currently old command and control shelters. We will follow on with that program. They have computer capability internally and they replace some other capability which we currently have in separate shelters. It is a much needed program.



AIRCRAFT OVER 20 YEARS OLD

OPTIONS TO MODERNIZE: EXTEND LIFE, MODIFY, PROCURE, OR LEASE

LEASING OFFERS IMMEDIATE INCREASED CAPABILITY WITH NO INCREASE IN EXISTING TOA

Finally we have a program to replace through leasing, our current operational support aircraft, the CJ-39 aircraft. That is currently being looked at. We have a request for proposals and we are hoping to be able to go on contract with lease to replace those aircraft this year.

Senator Warner. This would be aircraft that would be leased?

General Skantze. That is correct. Congress gave us approval to do this in the 1983 budget. We put a draft request for proposal out on the street the 22d of February. We will get responses and hopefully will be able to go on contract toward the end of the fiscal year and almost immediately start to acquire airplanes on a leased basis with the contractor providing the base support.

Senator Warner. Now, you go out in April 1983 with leasing completed in fiscal 1984?

General Gorton. We would hope to sign a contract.

General Skantze. It is a multiyear lease.

Senator Warner. This was in last year's budget?

General Skantze. That is correct.

Senator Warner. And this is ongoing, there is a line item for this?

General Skantze. Yes, there is.

Senator Warner. How many aircraft are involved?

General Skantze. About 120 to 140. About 40 of those will be turbo prop.

Senator Warner. What percentage of the existing fleet does that represent?

General Skantze. That is the total.

Senator **Warner**. What do you do with the existing aircraft, sell them?

General **Gorton**. We would deactivate them, sir.

General **Skantze**. We would deactivate them or sell them. They do not have a great deal of life left to them.

Senator **Warner**. Is that right? Primarily the engines?

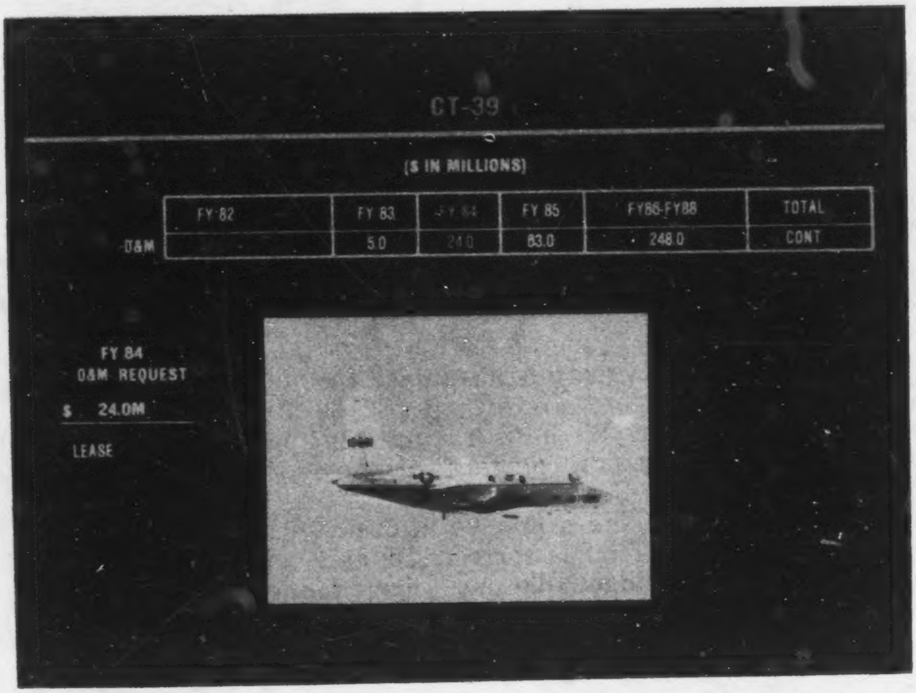
General **Skantze**. And the structure.

Senator **Warner**. And in the structure.

General **Skantze**. Yes.

General **Marshall**. Most of those were built back in about 1960.

Senator **Warner**. Go ahead.



CT-39

($ IN MILLIONS)

	FY 82	FY 83	FY 84	FY 85	FY86-FY88	TOTAL
O&M		5.0	24.0	83.0	248.0	CONT

FY 84
O&M REQUEST
$ 24.0M

LEASE

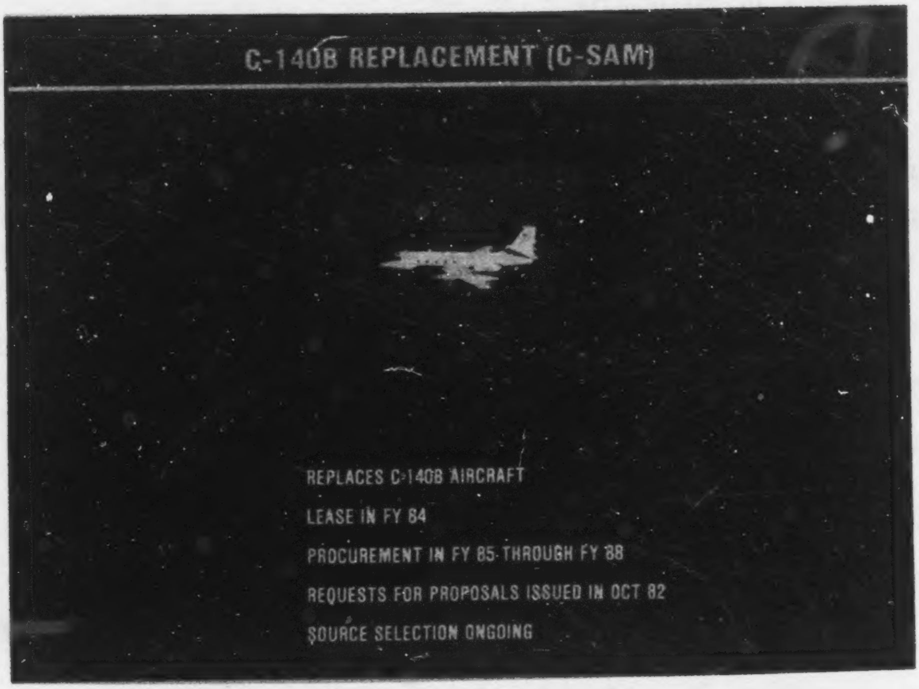
General **Gorton**. The funding for this program, Senator Warner, is exactly the same as continuing on with the T-39's. The contract would be let on the basis of no increased costs.

Senator **Warner**. Is there any chance it could be a parallel in the aircraft selection between this fleet and your tanker training?

General **Skantze**. It is possible.

Senator **Warner**. I would think the more commonality the better.

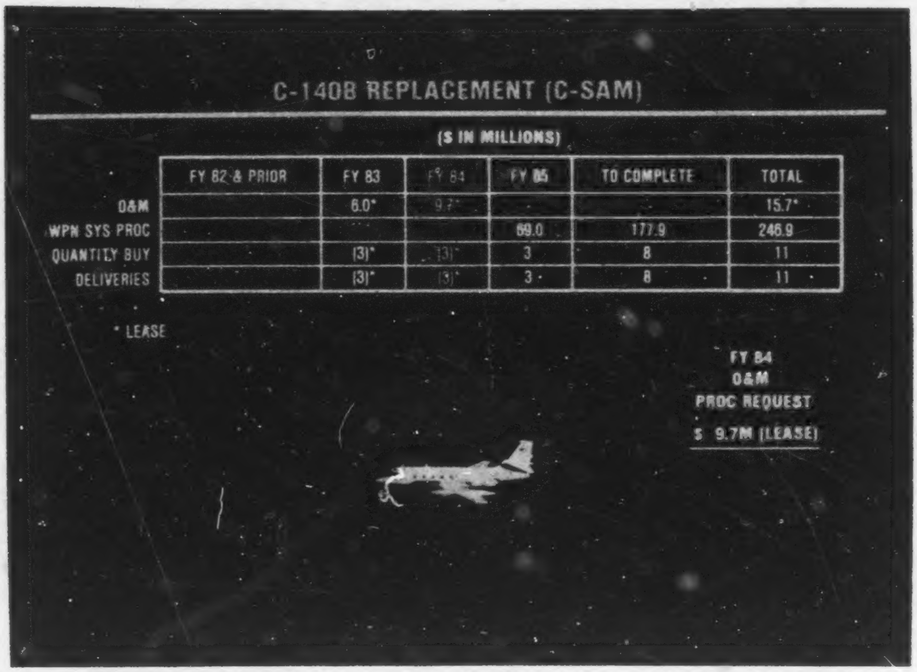
General **Gorton**. Sir, this is a program that is currently under source selection. It is to replace the larger variety of the operational support aircraft, the C-140. It is currently in source selection. We are looking to lease the first three and then procure the remainder.



C-140B REPLACEMENT (C-SAM)

- REPLACES C-140B AIRCRAFT
- LEASE IN FY 84
- PROCUREMENT IN FY 85 THROUGH FY 88
- REQUESTS FOR PROPOSALS ISSUED IN OCT 82
- SOURCE SELECTION ONGOING

Senator WARNER. Let us go back to the 140. You were using that for MedEvacs. What is the mission there?



C-140B REPLACEMENT (C-SAM)

($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
O&M		6.0*	9.7*			15.7*
WPN SYS PROC				69.0	177.9	246.9
QUANTITY BUY		(3)*	(3)*	3	8	11
DELIVERIES		(3)*	(3)*	3	8	11

* LEASE

FY 84
O&M
PROC REQUEST
$ 9.7M (LEASE)

General **Marshall**. That is the VIP.

Senator **Warner**. VIP and MedEvac.

General **Skantze**. It is not used for MedEvac, the C–9 is.

Senator **Warner**. The C–9. I thought the C–9 was on that previous chart.

General **Gorton**. Let us go back. No, sir, there is no C–9 on it. That is the Fokker 28. It is very similar to the C–9.

Senator **Warner**. What is the current mission of these aircraft?

General **Gorton**. They are basically for personnel transportation, the C–140's, the current C–SAM aircraft. These three aircraft would be off the shelf, off-the-shelf competitors.

Senator **Warner**. Now, the 737 what is that being used for?

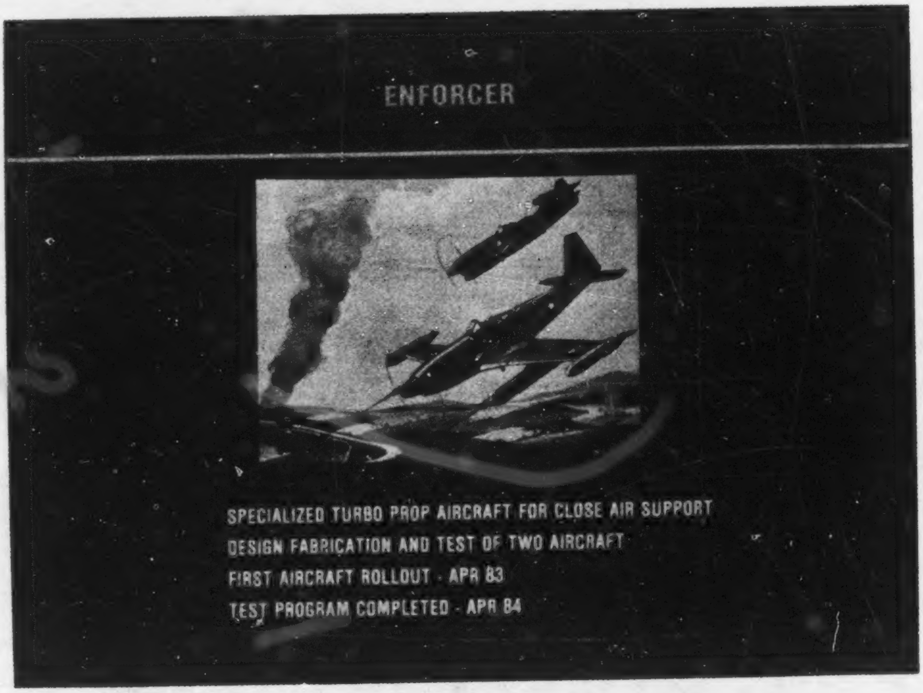
General **Gorton**. These are the candidates for the replacement, these three. They are currently being looked at and so selected. We would only get 11 aircraft.

Senator **Warner**. And their mission, again, would be personnel transportation?

General **Skantze**. That is correct. I think minimum requirements are 6 of them being capable of going coast to coast with 14 passengers, and the other 5 about 1,400 miles with 14 passengers.

Senator **Warner**. That F–28 certainly carries more than 14 passengers, up there in the left-hand corner.

General **Skantze**. That is correct. But the requirement is for 14. They bid what they wanted to bid.



ENFORCER

SPECIALIZED TURBO PROP AIRCRAFT FOR CLOSE AIR SUPPORT

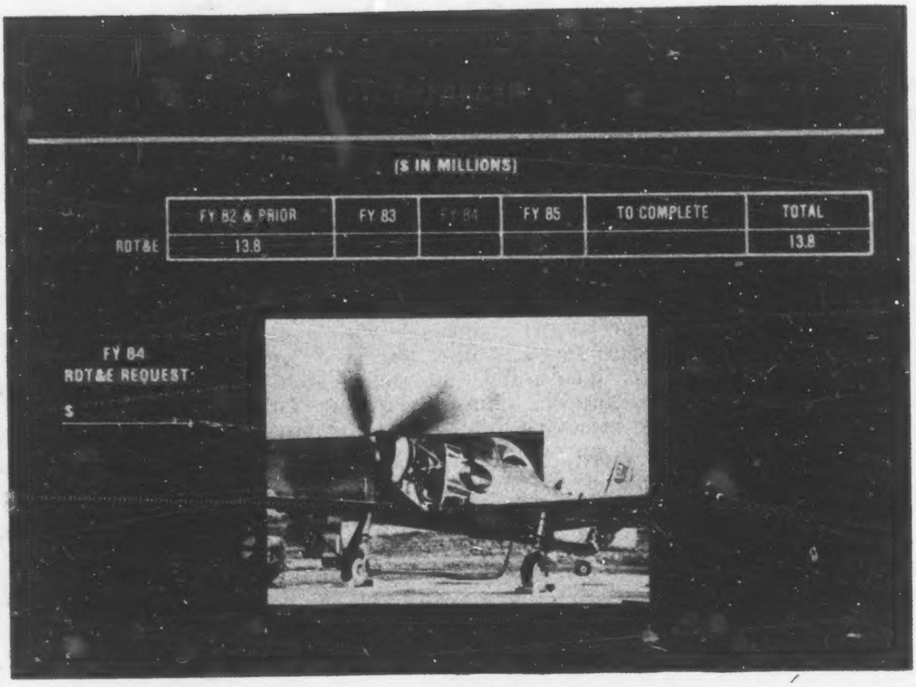
DESIGN FABRICATION AND TEST OF TWO AIRCRAFT

FIRST AIRCRAFT ROLLOUT - APR 83

TEST PROGRAM COMPLETED - APR 84

Senator **Warner**. Oh, you just put these slides on.

General **Skantze**. That is correct.



($ IN MILLIONS)

	FY 82 & PRIOR	FY 83	FY 84	FY 85	TO COMPLETE	TOTAL
RDT&E	13.8					13.8

FY 84
RDT&E REQUEST:
$

Mr. **Smith**. What was that last one, the Enforcer?

Senator **Warner**. Yes, you are right.

General **Skantze**. That is the whole fleet.

Senator **Warner**. What is the status of this program?

General **Gorton**. It was scheduled to fly the first part of December but it looks like it is slipping again for a few months right now. The contractor has not been able to get it all put together.

Senator **Warner**. How many aircraft were involved?

General **Gorton**. Right now there are only two.

Senator **Warner**. One crashed and they put it back together again.

General **Skantze**. That completes it.

Senator **Warner**. I would make one observation and ask counsel to look at it, the number of aircraft in this program associated with passenger transportation at this time. That is one of those profile items that sometimes attract attention to the detriment of the proposed budget.

All right, does that complete it?

General **Skantze**. Yes, sir.

Senator **Warner**. Gentleman, thank you very much for presenting your program this year. Additional questions will be submitted to be answered for the record.

[Questions, with answers supplied, follow:]

Question Submitted by Senator Barry Goldwater

INTERCHANGEABILITY OF AVIONICS ASSETS

Senator **Goldwater**. General Skantze, it is my understanding that the inertial navigation system in the F-16C and D model aircraft will be an Air Force standard system and will be different from the inertial system currently in the A and B model aircraft.

Recognizing the co-production requirement of these systems and the utilization by the European consortium countries of both versions of the aircraft, I am curious about the interoperability and interchangeability of the two inertial systems among all versions of the F-16 aircraft. Interchangeability of avionics assets on a fleet-wide basis will be important to our European allies and would be equally advantageous to us. Can you provide assurances that interoperability and interchangeability will be achieved and maintained?

General SKANTZE. The inertial navigation system (INS) selected for the F-16C/D aircraft is an Air Force standard system. The standard INS was chosen via competitive source selection and that competition resulted in a significant dollar savings to the US taxpayers.

The standard INS will not be interchangeable with the system on the F-16A/B's which is also the case with numerous other improved avionics systems on the F-16C/D aircraft. We will continue to have interchangeability between the USAF F-16A/B's and those of our European allies. Since none of the consortium countries have expressed an interest in buying F-16D/D aircraft, they will have only one INS to support. However, European manufacturers will be afforded the opportunity to co-produce the standard INS as well as the unit in the F-16A/B's.

Although interchangeability between the F-16A/B and the F-16C/D is lost, interchangeability between the F-16/D and other USAF aircraft which use the standard INS is gained. In addition to the interchangeability of the standard system, we will also realize benefits in common training, support equipment, maintenance, and spare parts. These advantages, combined with the significantly lower acquisition cost due to the competitive procurement, were the deciding factors in the selection of the standard INS for the F-16C/D's.

QUESTIONS SUBMITTED BY SENATOR EDWARD M. KENNEDY

AVERAGE AGE

Senator KENNEDY. General Skantze, what is the average age of the Air Force's fighter and attack force currently, and what is the trend in average age?

General SKANTZE. The current average age of the Air Force tactical fighter and attack force is approximately 8½ years. With programed procurement reflected in the fiscal year 1984 President's Budget, this average age will increase by approximately two years as we expand the force to achieve our 40 tactical fighter wing goal in 1988.

PROCUREMENT EACH YEAR

Senator KENNEDY. General Skantze, at current fighter and attack force levels, how many aircraft should the Air Force be procuring each year to: Maintain the average age of 10 to 11 years described by Secretary Weinberger in his posture statement; replace losses from the force due to retirement and attrition?

General SKANTZE. The current fighter and attack force age is approximately 8.5 years. If we assumed an average age of 10 years for the current 36 TFW force, the AF would require approximately 216 aircraft per year to maintain the 36 TFW's at the 10 year average age level and replace losses due to retirement and attrition. When the AF reaches the 40 TFW with an average age of 10 years goal, approximately 240 aircraft per year will be required to maintain the 10 year average age and replace losses due to retirement and attrition.

HIGHER FORCE LEVELS

Senator KENNEDY. General Skantze, what would be the number of aircraft required for annual procurement at higher force levels of 40 and 44 tactical fighter wings to maintain an average age of 10 to 11 years?

General SKANTZE. When the 40 TFW with an average age of 10.0 years goal is reached, an annual procurement of 240 aircraft will maintain this force size/age goal. A 44 TFW force at 10.0 years average age can be maintained with 264 aircraft per year.

INVENTORY COMPOSITION

Senator **Kennedy**. General Skantze, what is the inventory composition, by aircraft type, of the current figher and attack force, and what would the composition be for forces based on 4 and 44 tactical fighter wings?

General **Skantze**. The inventory, in TFW equivalents by aircraft type, of our programed and planned combat coded force structure follows:

36.3 TFW Force (fiscal year 1983):	
A-7	3.8
A-10	6.5
F-4	11.7
F-15	5.7
F-16	5.3
F-105	0.3
F-111	3.0
40 TFW Force (fiscal year 1988) (TFW equivalents):	
A-7	3.8
A-10	6.5
F-4	10.3
F-15	6.9
F-16	9.7
F-111	2.8
44 TFW Force (fiscal year 1983):	
A-7	2.8
A-10	5.9
F-4	5.1
F-15	10.2
F-16	17.3
F-111	2.7

CHANGE IN PROCUREMENT OBJECTIVE

Senator **Kennedy**. General Skantze, the program procurement objective for the F-15 was recently changed from 729 aircraft to 1452, an increase of 723. What is the composition of this 723 aircraft increment increase in terms of: Aircraft to replace F-15's provided to air defense units; a F-15E aircraft for ground attack; other (specify)?

General **Skantze**. The composition of the 723 aircraft is: (a) Aircraft 730 through 969 will be 240 F-15C/D. Approximately 150 of these aircraft will replace older F-15A/B's in General Purpose Tactical Air Force (TAF) units. These F-15A/B's will then be used to modernize air defense units and their associated training unit. The remainder will replace older F-4D's at a General Purpose TAF unit. (b) The composition and deployment of F-15's after aircraft 969 will not be decided until the decision is made on the Dual Role Fighter.

F-15'S FOR AIR DEFENSE FORCES

Senator **Kennedy**. General Skantze, how many of the 48 F-15 aircraft requested for fiscal year 1984 are to replace early model F-15's to be provided to air defense forces?

General **Skantze**. All 48 F-15C/D aircraft requested in the fiscal year 1984 President's Budget will replace older F-15A/B aircraft in General Purpose Tactical Air Forces (TAF) units. The F-15A/B aircraft will then be used to modernize air defense forces.

NEED FOR SPECIALIZED GROUND ATTACK VARIANTS

Senator **Kennedy**. General Skantze, please describe the need for specialized ground attack variants of either the F-15 or F-16 (the so-called E models of these aircraft)—given the F-111 force that the Air Force currently has available for this mission.

General **Skantze**. The Air Force has a valid requirement for a dual role variant of the F-15 and/or the F-16 which can increase the range/payload and night/under-the-weather capability of the surface attack force and which can augment the F-15 in air defense to meet the needs of the theater commanders. The dual role fighter will provide a much needed capability to attack both interdiction and counterair targets beyond the combat radius of the present fighter/attack force while carrying a larger payload of weapons. These dual role fighters will be optimized for night/

adverse weather attack and also possess significant air-to-air attact capabilities. These dual role aircraft will provide a much needed capability to attack a significant portion of those targets beyond the range of the present fighter/attack force which the small, over-tasked F-111 force can not cover. By having an overall complimentary mix of dual role fighters in our force structure, the Air Force will have the increased flexibility and ability to improve our warfighting capability.

CONFIGURATION ADDITIONS

Senator KENNEDY. General Skantze, please describe the configuration additions that would be required to the F-15C/D or the F-16C/D to obtain the F-15E or F-16E.

General SKANTZE. The configuration enhancements proposed to the F-15C/D model with Multi-Staged Improvement Program (MSIP) for the F-15E are as follows:

LANTIRN: Missionized Rear Cockpit; Combined gun/internal countermeasure set; Five station air-to-ground stores carriage; Nuclear capability; and VHF communications.

The F-16 configuration changes/enhancements added to an F-16C/D model with Multinational Staged Improvement Program (MSIP) for the F-16 are as follows:

Cranked Arrow Wing; Fuselage Plugs; Missionized Rear Cockpit; Drag Chute; and 48,000 lb max take-off gross weight.

FULL-UP RECURRING UNIT FLYAWAY COSTS

Senator KENNEDY. General Skantze, what are the estimated full-up unit flyaway costs for the F-15E and F-16E based on a procurement level of 400 aircraft—in constant and escalated dollars?

General SKANTZE. The following estimated unit recurring flyaway costs are based on August 1982 AFSC Independent Cost Analysis (ICA) of the proposed F-15E and F-16E programs and reflect the procurement rates requested in the fiscal year 1984 President's Budget on the F-15C/D and F-16C/D.

[In millions of dollars]

	Fiscal year 1983	Then year
F-15E	21.6	32.6
F-15C/D	20.5	31.0
F-16E	14.6	22.4
F-16C/D	11.0	16.9

Cost estimates are category II—Mature.

HIERARCHY OF PRIORITIES

Senator KENNEDY. General Skantze, in the so-called "A-cubed" study conducted by Air Force Systems Command, these "E-model" derivative fighters were displayed as close to the margin in the Air Force hierarchy of priorities. Is this the case? Why?

General SKANTZE. The Derivative Fighter Program is not close to the margin in the Air Force hierarchy of priorities. The "A-cubed" study used the fiscal year 1984 AF POM as a hypothetical budget example on which to overlay the graph for potential impact of cost growth and unfulfilled procurement authority expectations. The graph was merely used to emphasize a point in the study and did not imply that requirements for the Derivative Figher Program were rated any less than other programs.

The narrative accompanying the chart referred to in the "A-cubed" study states that, "This analysis does not imply that the Air Force expects continued cost growth at any level, that the fiscal year 1984 budget will be significantly reduced, or that any particular program could be cancelled without adversely impacting national security".

QUANTITATIVE LEVELS OF PERFORMANCE

Senator KENNEDY. General Skantze, the Air Force will conduct a competitive procurement for engines that can power the F-15 and F-16 because of past problems with the F100 engine that is the current power plant. Specifically, where there are shortfalls in F100 performance, what are the quantitative levels of performance the Air Force desires in its fighter engines?

General **Skantze**. The Air Force is not conducting a competition because of past F100 problems. Because this engine powers both our front-line fighters, the F-15 and the F-16, we have committed to resolve any residual problems with the current engines and have successfully achieved many near-term objectives. The Projected 1985 Version F100 engine below represents that solution.

For the future, we intend to acquire engines that are more durable, more easily maintained, more reliable and with much improved operability. We are convinced that the best way to achieve these goals is through competition.

Some of the objectives and goals are listed below:

	Projected 1985 version F100 (3)	Projected competitive engine benefit
Durability	1,800 cycles	4,000 cycles.
Stall/Stag per 1,000 flight hrs	0.2–1.0	0–0.1.
Augmentor operability	Instability in segments 2 and 3	No instabiity.
Performance loss	1 percent in 400 cycles	Less than 2 percent in 4,000 cycles.
Throttle restrictions	Some pilot cautions in certain parts of envelope.	Unrestricted.
Dollars flying hrs	543	310–435.
Removals/1,000 flying hrs	6.8	5.0–5.9.
Trim time	80 min	None.[1]

[1] Functional check only.

DEVELOPMENT FUNDING

Senator **Kennedy**. General Skantze, please show the development funding—by fiscal year and by engine type—necessary to bring the F100 to levels of maturity such that procurement competition can take place.

General **Skantze**. Here is the R&D funding necessary for both competing engines (dollars in millions).

	Fiscal years			
	1982	1983	1984	1985
F100 improved life core[1]	21	25	29	5
F100 DEEC/Gear pump	2	53	34	14
Subtotal F100	23	78	63	19
F110 total	35	55	98	20

[1] Portion of CIP funds listed are for the improved life core necessary to achieve a competing engine. Other F100 CIP tasks being performed are not included.

Note.—Includes airframe integration.

PERFORMANCE LEVELS EXHIBITED

Senator **Kennedy**. General Skantze, against these desired levels as a baseline, what performance levels have the F100 and F110 exhibited to date?

General **Skantze**. The F110 has demonstrated over 5000 TAC cycles durability in Accelerated Mission Testing (AMT). This test cycle was the same one to which F100s have been subjected prior to recent test cycle revisions. Furthermore, successful flight tests have been accomplished in the F-16A and F-14 and are being accomplished now in the F-16XL. Thus far the engine has demonstrated excellent durability, operability and reliability.

The F100 DEEC control has demonstrated substantial improvements in engine operability through flight tests conducted in both the F-15 and the F-16. The increased life core (ILC) being developed for the F100-220 is now undergoing initial durability tests in the factory; certain selected airfoil samples have already run for 5000 TAC cycles in various engine AMTs.

Both engines will be tested to the latest version of the AMT (AMT VII) which will validate durability against the latest analysis of actual and expected mission usage. They will be required to demonstrate in excess of 4000 equivalent TAC cycles prior to completion of Full Scale Development.

COMPETITIVE PROCUREMENT PURCHASE

Senator KENNEDY. General Skantze, will the competitive procurement be either-or-purchase, or will both engines remain in procurement after the competitive process starts?

General SKANTZE. The Air Force has carefully maintained all its options, including either a single award or a dual award. The best overall course of action for the Air Force will be determined later during the source selection process.

MRASM VARIANT

Senator KENNEDY. General Skantze, in the so-called "A-cubed" study conducted by the Air Force Systems Command, the MRASM variant of the Tomahawk cruise missile was shown as the system nearest the margin in Air Force hierarchy of priorities? Is this the case? Why?

General SKANTZE. The MRASM Program is not close to the margin in the Air Force hierarchy of priorities. The "A-cubed" study used the fiscal 1984 AF POM as a hypothetical impact of cost growth and unfulfilled procurement authority expectations. The graph was merely used to emphasize a point in the study and did not imply requirements for the MRASM Program were rated any less than other program.

The narrative accompanying the chart referred to in the "A-cubed" study states that, "this analysis does not imply the Air Force expects continued cost growth at any level, that the fiscal year 1984 budget will be significantly reduced, or that any particular program could be cancelled without adversely impacting national security."

WASP AND MAVERICK

Senator KENNEDY. General Skantze, the WASP and Maverick ground-attack missile programs were also shown to be near the margin in the "A-cubed" study. Is this the case? Why?

General SKANTZE. The Affordable Acquisition Approach (A^3) Study presented a hypothetical budget example to show that all programs could not be supported if real cost growth and/or budget reductions caused a loss of buying power. Wasp and IIR Maverick were included in this example based on their relative rankings within the fiscal year 1984 Program Objective Memorandum (POM). The A^3 Study was performed to identify potential limitations in the current defense budget formulation process.

ALTERNATIVE GROUND ATTACK WEAPONS

Senator KENNEDY. General Skantze, what alternative ground-attack weapons would the Air Force prefer to employ in the place of WASP and Maverick if these programs were terminated?

General SKANTZE. If the Wasp and Maverick programs were terminated, the Air Force would be limited to employment of current or near-term inventory weapons such as Rockeye, the 30mm gun, and Combined Effects Munitions (CEM). Each of these weapons require overflight of the target, and provide neither night nor standoff capabilities inherent in Wasp and Maverick.

The Air Force is starting development of the Sensor Fuzed Weapon (SFW), which is a Tactical Munitions Dispenser (TMD) filled with a smart, but relatively low cost, antiarmor submunition. This will provide a direct delivery, multiple kill per pass capability. We later plan on placing these submunitions in the Standoff Attack Weapon (SAW), also now beginning development, which will add standoff capability.

If both Wasp and Maverick are cancelled, the Air Force would most probably increase the funding priority for SAW and SFW.

HARM ANTIRADIATION MISSILE

Senator KENNEDY. General Skantze, the HARM anti-radiation missile was also shown to be near the margin in the "A-cubed" study. Is this the case? Why?

General SKANTZE. The Affordable Acquisition Approach (A^3) Study presented a hypothetical budget example to show that all programs could not be supported if real cost growth and/or budget reductions caused a loss of buying power. HARM was included in this example based on the relative rankings within the fiscal year 1984 Program Objective Memorandum (POM). The A^3 Study was not performed to suggest solutions, but to identify weaknesses in our present way of doing business.

ARGUMENTS IN SUPPORT OF AF POSITION

Senator KENNEDY. General Skantze, the Navy has testified before this Subcommittee that providing a second source of production for HARM is a sound program strategy for procurement of HARM. Why does the Air Force disagree? What are the specific economic arguments in support of the Air Force position? Is there support for the Air Force position elsewhere within the Department of Defense?

General SKANTZE. The Air Force supports competition on those programs where the expected benefits outweigh the penalties. For the HARM program, the benefits of competition are being accrued through vendor/subcontractor level competition. The Air Force has determined, using the Navy's program cost estimates, the dual prime sourcing does not result in a savings to the government. The OSD Cost Analysis Improvement Group (CAIG) also did an independent estimate to support the HARM DSARC. The CAIG also concluded that second prime sourcing will not result in a savings.

The specific reasons that HARM competition is not cost effective are: (a) a large upfront investment in capital equipment, tooling and test equipment for a second contractor are needed; (b) the joint USAF/USN planned buy is relatively small; and (c) the second source is being introduced late in the program.

The DOD position on HARM has not been established. A DSARC decision memorandum on HARM is expected soon and will establish a DOD position on the HARM acquisition strategy.

EXPLAIN PROGRAM UNIT COST OF HH-60D

Senator KENNEDY. General Skantze, is the program unit cost for Army's UH-60A $6.6 million? Why then is the program unit cost of the HH-60D, a variant of the UH-60A helicopter $20.7 million?

General SKANTZE. A more relevant comparison of the program unit costs is in constant year dollars, negating the impact of inflation.

In constant 1983 dollars the program unit cost of the Army UH-60A is approximately $6.1 million. Army estimates have been adjusted by the same inflation rates used to calculate Air Force HH-60D costs for purposes of comparsion. The corresponding HH-60D program unit cost in constant 1983 dollars is $13.9 million.

Two factors account for this difference in cost: First, the Army figure spreads nonrecurring costs over 22 years (1968-1990) and 1107 aircraft while the HH-60D figure averages these costs over 9 years (1982-1991) and 243 aircraft.

Secondly, while the HH-60D is a variant of the UH-60A, it will have significantly increased capability. In order to perform the Air Force combat rescue and special operations missions the HH-60D requires the following modifications:

Air refueling and additional fuel capacity (internal and external) to increase range.

More powerful (Navy Seahawk) engines and transmission to meet hover requirements.

Automatic flight control system (Navy Seahawk) to reduce pilot workload during critical hover operations.

Hydraulic hoist (Navy Seahawk) for survivor recovery.

Specialized avionics (doppler/inertial navigation system, terrain following/terrain avoidance radar, forward looking infra-red, central avionics computer, remote map reader) to allow low altitude operations at night and in adverse weather conditions.

In then year dollars the comparative program unit costs are $6.6 million and $20.7 million respectively.

FUNDS TO CONTINUE SHORAD

Senator KENNEDY. General Skantze, last year the Congress added $50 million to the Air Force missile procurement account to begin procurement of a short-range air-defense (SHORAD) system for US air bases on the European continent. Why has the Air Force not requested funds in fiscal year 1984 to continue this program?

General SKANTZE. The Air Force has not selected a short-range air-defense (SHORAD) missile system for US air bases on the European continent. Analyses of various alternatives are continuing. Since system selection has not been made, no funds were requested in the fiscal year 1984 budget. Depending on the system selected and cooperative arrangement developed, subsequent budgets will include funding requests to continue the continental Europe SHORAD program.

TOTAL PROCUREMENT COST FOR SHORAD DEFENSE

Senator KENNEDY. General Skantze, what would be the approximate total procurement cost if the Air Force were to provide its own SHORAD defense for its air bases on the European continent?

General SKANTZE. The total procurement cost for a continental Europe short range air defense (SHORAD) system will depend on a number of variables. For example, the number of bases requiring further protection, the type of missile system to be employed, the level of protection required, the type of cooperative arrangement developed with a foreign nation, and the procurement strategy and timing are all major determinants in the total procurement cost for a SHORAD system. The Air Force is evaluating these and other factors to arrive at an optimum system selection within fiscal constraints.

Current estimates range from $50 million for an unsophisticated system providing limited capability at a few selected bases to more than $2 billion for a more sophisticated system providing better coverage at most US air bases. A more precise estimate can be provided upon completion of our current investigations.

JSTARS

Senator KENNEDY. General Skantze, what is the total program cost estimate for JSTARS (Joint Surveillance and Targeting Radar System)?

General SKANTZE. Current planning provides $534 million for Joint STARS development split between Army and Air Force. This planning will be updated in 3QFY83. At that time we will have determined the management approach to full scale development and completed the system specification.

JTACMS

Senator KENNEDY. General Skantze, what is the total program cost estimate for the JTACMS (Joint Tactical Missile System) and the cost estimate for the Air Force portion of the program. How many missiles will be procured?

General SKANTZE. Current planning provides $1,750 million in the fiscal year 1984-88 FYDP for ground and air launched JTACMS, split between Army and Air Force. The Air Force planned portion of this amount is $513 million.

The estimates of development and procurement costs will be refined later in 1983 as the Joint Services Operational Requirement is complete, commonality studies are done, and the system specification is finalized. This data will also allow us to project the procurement quantity and estimated total program costs.

COMBAT IDENTIFICATION SYSTEMS

Senator KENNEDY. General Skantze, what is the total program cost for combat identification systems, a joint program with the Navy. What is the cost of the Air Force portion of the program? How many aircraft sets of equipment will be procured for Air Force aircraft? What will be the resulting unit cost of equipment for Air Force aircraft?

General SKANTZE. The Combat Identification System (CIS) is a Tri-Service, Air Force led program to improve the identification capabilities of US forces worldwide. To accomplish this, the program is pursuing the development and fielding of a complementary mix of multiple identification techniques. Such an approach is necessary to meet the wide range of combat conditions and operations that exist.

The major thrust and common core element upon which this improved capability is to be built is a new friend identification system, called Mark XV. It will be a NATO interoperable electronic system which uses encrypted challenges and replies to cooperatively identify friendly aircraft and ships similarly equipped.

Mark XV is intended to complement and support other identification approaches, such as noncooperative techniques which are typically weapon system unique and provide foe identification, as well as indirect techniques which are embedded in the command and control structure and involve improvements for processing and disseminating identification information in support of force management.

The total program cost is largely driven by the cost of the Mark XV because this system may be nearly universally applied to our weapon systems. In contrast, noncooperative and indirect techniques will be selectively implemented and will attempt to use existing sensors and communications systems.

Estimates for the Mark XV currently have a large degree of uncertainty due to the early phase of the system design and the lack of detailed knowledge on the extent of implementation and the nature of the transition phase. Initial, rough estimates place the Tri-Service cost for development at about four hundred million dollars and production and installation between four and five billion dollars (constant fiscal year 1982 dollars).

The Air Force share would be approximately one-third of this total, expended over an estimated ten year production/installation phase.

Current estimates for Air Force equipage are that thirteen thousand transponders at one hundred thousand dollars each for hardware and integration, and thirty-four hundred interrogators at one hundred and fifty thousand dollars each for production and installation will be fielded.

Questions Submitted by Senator Carl Levin

EXPAND TACTICAL COMBAT AIRCRAFT WINGS

Senator **Levin**. Much has been made of this Administration's intentions to expand out Air Force tactical combat aircraft wings from the present 37 active/reserve wings to the more than 40 wings which had existed in the out-year plans of the past administration. Last year, the Defense Secretary's Annual Report, or Posture Statement, said the AF would fully equip 40 active and reserve tactical aircraft wings by fiscal year 1986. Is this effort still on schedule?

General **Skantze**. The Air Force effort to fully equip 40 combat coded tactical fighter wings is on track to achieve our goal early in fiscal year 1988.

28/13 WINGS BY FISCAL YEAR 1988

Senator **Levin**. The Defense Secretary's Posture Statement this year says that, by fiscal year 1988, the AF expects to have the equivalent of nearly 28 fully equipped active wings and just over 13 Air National Guard and Air Force Reserve wings—or about 41 wings. Is this effort still on schedule?

General **Skantze**. Yes. The fiscal year 1984 President's Budget reflects the intent to have 27.8 Active, 10.0 Air National Guard, and 3.3 Air Force Reserve tactical fighter wings in fiscal year 1988.

WING EXPANSION VERSUS LACK OF PILOTS

Senator **Levin**. As of 3 Feb 83, the AF told me that it expects that its current pilot shortage will continue through fiscal year 1988, not even including the effects of the Administration's proposal not to have a military pay raise in fiscal year 1984. How can the Air Force justify its wing expansion plan for both fiscal year 1986 and fiscal year 1988 if it does not expect to have enough pilots for these wings by either year?

General **Skantze**. Our pilot inventory levels have improved since 1980 due to a number of management initiatives not the least of which has been the recent flying and military pay adjustments. The impact of the fiscal year 1984 pay freeze on recent positive pilot inventory growth is unknown. If adequate compensation, however, is restored in fiscal year 1985, we could anticipate an approximate continuation of current retention levels. Despite some shortages today, all crew force pilot positions are manned at 100 percent. Our management plan for the outyears fiscal years 1986–88) is to continue to fill crew force billets at 100 percent levels with any vacancies prioritized out of staff manning. In the long term, the force structure associated with the wing expansion plan will provide more cockpit positions which will better enable the Air Force to grow to and sustain its total pilot requirement.

Senator **Warner**. The subcommittee is adjourned.

[Whereupon, at 11:05 a.m., the subcommittee adjourned, to reconvene subject to the call of the Chair.]

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